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MACKENZIE VALLEY PIPELINE INQUIRY

Government  
Publications

IN THE MATTER OF APPLICATIONS BY EACH OF

- (a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A  
RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS  
CROWN LANDS WITHIN THE YUKON TERRITORY AND  
THE NORTHWEST TERRITORIES, and  
(b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY  
THAT MIGHT BE GRANTED ACROSS CROWN LANDS  
WITHIN THE NORTHWEST TERRITORIES  
FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND  
ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION,  
OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE  
PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

October 7, 1976.

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PROCEEDINGS AT INQUIRY

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Volume 195





APPEARANCES:

Mr. Ian G. Scott, Q.C.,  
Mr. Stephen T. Goudge,  
Mr. Alick Ryder, and  
Mr. Ian Roland, for Mackenzie Valley Pipeline  
Inquiry;

Mr. Pierre Genest, Q.C.,  
Mr. Jack Marshall,  
Mr. Darryl Carter,  
Mr. J.T. Steeves, and for Canadian Arctic Gas Pipe-  
Mr. Gerry Ziskrout, line Limited;

Mr. Reginald Gibbs, Q.C.,  
Mr. Alan Hollingworth,  
Mr. John W. Lutes, and for Foothills Pipe Lines Ltd.;  
Mr. Ian MacLachlan,  
Mr. Russell Anthony,  
Prof. Alastair Lucas and  
Mr. Garth Evans, for Canadian Arctic Resources  
Committee;

Mr. Glen W. Bell and  
Mr. Gerry Sutton, for Northwest Territories  
Indian Brotherhood, and  
Metis Association of the  
Northwest Territories;

Mr. John Bayly and  
Miss Lesley Lane, for Inuit Tapirisat of Canada,  
and The Committee for  
Original Peoples Entitle-  
ment;

Mr. Ron Veale and  
Mr. Allen Lueck, for The Council for the Yukon  
Indians;

Mr. Carson Templeton, for Environment Protection  
Board;

Mr. David H. Searle, Q.C.  
for Northwest Territories  
Chamber of Commerce;

Mr. Murray Sigler and for The Association of Municipi-  
Mr. David Reesor, palities;

Mr. John Ballem, Q.C., for Producer Companies (Imperial,  
Shell & Gulf);

Mrs. Joanne MacQuarrie, for Mental Health Association  
of the Northwest Territor-  
ies.

CANADIAN ARCTIC  
GAS STUDY LTD.  
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1 Yellowknife, N.W.T.

2 October 7, 1976

3 (PROCEEDINGS ADJOURNED PURSUANT TO ADJOURNMENT)

4 THE COMMISSIONER: We'll come  
5 to order then, ladies and gentlemen.

6 MR. GOUDGE: We're prepared to  
7 begin, sir. I should say before we begin, how nice it  
8 is to have Miss Hutchinson back in action with us.

9 Sir, we have today for the  
10 benefit of those who are present in the audience, two  
11 panels, one by each of the pipeline applicants. Each  
12 panel is going to deal with certain matters connected  
13 with the building of their particular pipelines, and  
14 the consequences of certain aspects of building it.

15 The panel we begin with is  
16 the panel of Foothills Pipe Lines, and Mr. Hollingworth  
17 will introduce the panel and I think say a little  
18 something about what the panel will tell you.

19 Mr. Hollingworth?

20 MR. HOLLINGWORTH: Thank you,  
21 Mr. Goudge. Mr. Commissioner, before you see  
22 Mr. Mirosh, a familiar face at the Inquiry, the vice-  
23 president of engineering and construction of Foothills  
24 Pipe Lines; and with him is Mr. Robert Byers, co-  
25 ordinator of environmental affairs, Foothills Pipe Lines.  
26 Mr. Kosten, another witness familiar to you, the  
27 manager of construction of Foothills Pipe Lines, was  
28 unable to get a plane yesterday and will be up,  
29 arriving -- he should be down on the ground by now  
30 and will be joining the panel presently.





1                               We propose, sir, to have  
2 Mr. Mirosh and Mr. Byers read in the evidence in  
3 chief, including that of Mr. Kosten, and if Mr. Kosten  
4 still hasn't shown up I would ask the other parti-  
5 cipants to restrict their cross-examination to those  
6 questions they have for Mr. Mirosh and Mr. Byers until  
7 such time as Mr. Kosten is here and able to take his  
8 place on the panel.

9                               As will become apparent during  
10 the evidence, sir, there are several points to be  
11 touched by this panel. Some time ago I announced to  
12 you that Foothills Engineering Department had come to  
13 the conclusion that the winter conditions on the  
14 northern 50 miles of the proposed Foothills pipeline  
15 were too severe to construct a pipeline during the  
16 winter within the time constraints that are there, and  
17 therefore the use of a gravel pad as a construction  
18 surface for late summer construction has been proposed  
19 by Foothills, and details of this plan will be outlined.

20                              Further, in refining the  
21 construction plan, Foothills has opted for the re-  
22 location of certain construction camps, from compressor  
23 station sites to wharf and stockpile sites. They have  
24 opted for the use of warm water as the primary method  
25 of hydrostatic testing of the pipe, once the pipe is  
26 in place, rather than the water methanol solution which  
27 has been previously suggested. There is also a plan  
28 to introduce the single construction spread, working  
29 one year in advance of the main pipeline construction  
30 in order to get an idea of whether the construction





Mirosh, Byers  
In Chief

1 scheme is a viable one, and whether changes will be  
2 made before the main activity gets under way.

3 Finally, sir, there will be  
4 some detailed evidence on the restructuring of the  
5 logistics plan.

6 Mr. Byers is here principally  
7 to speak to the matter of the gravel pad construction  
8 but he will also address himself to other changes in  
9 the construction plan, and the environmental implica-  
10 tions of those changes.

11  
12 EDWARD MIROSH, resumed:

13 ROBERT BYERS, sworn:

14 DIRECT EXAMINATION BY MR. HOLLINGWORTH:

15 Q With those preliminary  
16 remarks, sir, I'd ask Mr. Byers to read his C.V. to  
17 you. Mr. Byers?

18 WITNESS BYERS: Thank you,  
19 Mr. Hollingworth. I received my education, Bachelor  
20 of Science degree from Brandon University in 1974.  
21 From there I signed onto graduate studies at the  
22 University of Calgary. I did not complete those  
23 studies, at which time I came to Foothills Pipe Lines.  
24 Prior to attending university, from 1968 to 1971  
25 approximately, I worked with TransCanada Pipelines,  
26 who have their offices in Toronto and in Winnipeg,  
27 involved in various facets of pipeline activities.

28 In the summer of 1972 I again  
29 worked for TransCanada but at that same time I worked  
30 with Great Lakes Gas & Transmission Company on part of



Mirosh, Byers  
In Chief

1 their line in Michigan. In the summer of 1973 I worked  
2 on an limnological survey program as part of the  
3 environmental studies of the proposed Mackenzie Highway.  
4 At that time I was working for Lombard North group  
5 from Calgary.

6 The summer of 1974, well at  
7 the University of Calgary I worked on various aquatic  
8 surveys -- excuse me, I'm sorry, I got ahead of myself  
9 here. In the summer of '74 before attending the  
10 University of Calgary, I worked on various aquatic  
11 surveys and aquaculture programs with the Lombard North  
12 group, and then from the summer of 1975 to the present  
13 I've been co-ordinating environmental affairs with  
14 Foothills Pipe Lines.

15 Q Thank you, Mr. Byers.  
16 Perhaps you could explain what a limnological survey  
17 is?

18 A Limnology is defined  
19 as the study of fresh water and the potential of  
20 a highway development along the valley and the impact  
21 this could have on stream areas and aquatic systems  
22 necessary to establish baseline data to evaluate  
23 the possibilities what a highway might do to these  
24 freshwater areas.





Mirosh, Byers  
In Chief

Q

Could you

put your microphone a little closer to you sir. Mr. Mirosh you have appeared before this Inquiry on previous occasions?

WITNESS MIROSH: Yes, I

appeared before this Inquiry earlier this year as a member of various panels related to Foothills Engineering Construction Operations matters.

Q Can you explain the nature

of this panels appearance before this Inquiry at this time?

A In the intervening several

months since our last appearance, we have introduced several changes to our construction plan, which we have put before the National Energy Board and which we now wish to make the Inquiry aware.

Some of these changes resulted in the revision of Part 3, Section B of the Construction Plan of our application and this amendment was filed with the Inquiry earlier this year.

There are several specific items to which this panel will address its evidence. These items are as follows:

- a) the use of a gravel pad as a construction surface on the northern most fifty miles of Foothills' pipeline.
- b) relocation of Foothills' pipeline construction camps from compressor station sites to wharf and stockpile sites.
- c) , the use of warm water as a primary hydrostatic test



Mirosh, Byers  
In Chief

medium as opposed to the use of water methanol.

- d) the introduction of a single pipeline construction spread working one year in advance of the first year of mainline pipeline construction.
- e) a restructuring of the logistics plan based on more efficient allocation of and a reduction in the number of primary and secondary staging sites.

Q Can you explain how these changes came about?

A In the case of the gravel working surface in the northernmost fifty miles, this recommendation came from our construction department and Mr. Kosten will explain the reasoning behind it in his evidence.

The suggestion to relocate camps also came from the construction department and again Mr. Kosten will address himself to that reasoning in his evidence.

The use of a warm water test media was recommended by various departments in Foothills and was studied both from a geothermal and from an environmental point of view. Simplified logistics and the use of a proven method for hydrostatic testing were the two principal motivations for this recommendation.

The introduction of a spread into the field one year in advance of main pipeline construction was again recommended by several departments and the primary reasoning for such action was to gain advance construction and environmental interface





1 information prior to the main pipeline construction  
2 work.

3 The restructuring of our  
4 logistics plan evolved from our efforts to optimize  
5 the movement of materials for the construction of this  
6 project.

7 In all cases, these amendments  
8 were discussed amongst engineering, construction and  
9 environmental personnel to the satisfaction of each  
10 group. Mr. Byers, will present in his evidence, our  
11 environmental department's input to these matters.

12 Q Can you explain more  
13 specifically the changes to your logistics plan?

14 A The logistics plan which  
15 we had previously put forward before the Inquiry  
16 visualized the movements of materials from southern  
17 Canada to several primary staging sites located at not  
18 only Enterprise, Hay River and Axe Point, but also at  
19 Camsell Bend, Poplar Landing, Dory Point, Fort Simpson,  
20 Whitehorse and Arctic Red River. Upon further study,  
21 we have found it advantageous to eliminate all such  
22 primary staging sites with the exception of Enterprise,  
23 Axe Point and Hay River.

24 In addition, we determined  
25 that we could eliminate one of our wharf staging sites  
26 and three secondary staging sites which were located  
27 near the Mackenzie Highway south of Wrigley.

28 A map attached as Appendix  
29 A to this evidence details our current logistics plan.

30 Q Can you explain the



Mirosh, Byers  
In Chief

1 details related to your proposed gravel pads?

2 A The details of the gravel  
3 pad are outlined in the attached report on the gravel  
4 pad which is Appendix B to this evidence. Additional  
5 information is supplied in Appendix C which is a report  
6 detailing the geothermal characteristics of the gravel  
7 pad.

8 Q Can you explain the  
9 warm water testing plan which you propose?

10 A We have determined that  
11 there is a cost advantage in the use of warm water as a  
12 testing medium providing that water is available within  
13 about three miles of the pipeline test section. On  
14 this basis, we feel that the major portion of the pipeline  
15 can be hydrostatically tested with warm water. However,  
16 there may be the requirement for some water methanol  
17 testing in some segments of the pipeline which are  
18 deficient in suitable water supply.

19 The report on warm water  
20 testing of Section 5, which is attached as Appendix D  
21 to this evidence, gives an example of the procedure  
22 which will be adopted on all sections where warm water  
23 testing will be applied. The report in addition contains  
24 some information with respect to the geothermal  
25 characteristics of warm water testing.  
26  
27  
28  
29  
30





Mirosh, Byers  
In Chief

1 Q Thank you sir and I'd  
2 ask if you could continue with Mr. Kosten's evidence.  
3 Can you comment on why you have made a recommendation  
4 to convert spread I of your construction plan from a  
5 winter spread to summer construction?

6 A We have now concluded  
7 that in order to assure completion of the project on  
8 schedule, we would be prudent to schedule the con-  
9 struction of the most northerly, approximately 50 miles  
10 from the Taglu Plant south, during a period when  
11 weather conditions are less severe. We, therefore,  
12 propose to construct this section from a granular mat-  
13 erial work pad. Pipeline construction would take  
14 place during the approximate period of August 15th to  
15 October 31st.

16 Q What are the severe  
17 conditions to which you refer?

18 A Subsequent to the filing,  
19 we have obtained more specific atmospheric data from  
20 coastal and inland weather stations, regarding temp-  
21 eratures and wind velocities, and we have had dis-  
22 cussions with pipeline contractors experienced in  
23 working during the winter.

24 We derived the wind chill  
25 temperatures from the corresponding temperatures and  
26 wind velocities during January, February, March and  
27 April on the coastal stations and likewise for the  
28 inland stations. We found that wind chill tempera-  
29 tures at the coastal stations were considerably more  
30 severe than those of the corresponding conditions





Mirosh, Byers  
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1 at Inuvik which in distance is about equivalent to  
2 Mile Post 75 along the right-of-way. We, therefore,  
3 concluded that there would be a problem with con-  
4 structing the most northerly portion of the system to  
5 about the midpoint between our Mile 0 and Mile 75 and,  
6 therefore, changed to fall construction from Mile 0  
7 to approximately Mile 50.

8 Q The conditions that you  
9 anticipate from Mile 50 to the end of Spread I are than  
10 acceptable to construct this portion as previously  
11 planned?

12 A Yes, based on the data  
13 available from Inuvik our conclusions are, that we  
14 would have sufficient acceptable work days to complete  
15 the balance of Spread I as previously planned. The  
16 balance of Spread I, of course, would be reduced to  
17 39 miles in one winter season.

18 Q What would be the timing  
19 of construction of the section from Mile Post 0 to  
20 Mile Post 50 in relation to the construction of the  
21 rest of the mainline?

22 A We would construct this  
23 section in the fall of the year preceding the first  
24 year of the mainline construction on the rest of the  
25 system. The spread of equipment would then construct  
26 the section from Mile Post 0 to Mile Post 89 during the  
27 first winter season of pipeline construction rather  
28 than during the second year as previously planned.

29 Q Did you mean from Mile  
30 Post 50 or from Mile 0 to Mile Post 89?



Mirosh, Byers  
In Chief

1 A I'll read that second  
2 sentence again.

3 The spread of equipment would  
4 then construct the section from Mile Post 50 to Mile  
5 Post 89 during the first winter season of pipeline  
6 construction rather than during the second year as  
7 previously planned.

8 Q Will you give us your  
9 fundamental reasoning for proposing a change in the  
10 location of construction camps?

11 A Upon further analysis of  
12 the scheduling and sequencing of the construction plan,  
13 we feel that the stockpile sites are a more logical  
14 location for the camps for the mainline construction  
15 crews. We will place the camp for the compressor  
16 station crews at the station sites, which is a more  
17 conventional approach as we would prefer to have a  
18 separation of these crews in any event since there are  
19 different craftsmen -- since there are different crafts-  
20 men and trades involved. The fundamental reason,  
21 however, is that where the camps are brought in by  
22 barge, and brought in to the stockpile sites, the erection  
23 and installation of the camps can begin immediately  
24 they arrive on site. If we place them on the compressor  
25 station pads, we are required to wait until the winter  
26 roads are constructed to the compressor station sites.  
27 When one considers that the camp utilities will take  
28 considerable time to install, it is more logical to  
29 allow for the installation of the camp and utilities  
30 as soon as these facilities arrive at the stockpile site





Mirosh, Byers  
In Chief

1 rather than be restricted to waiting until winter and  
2 snow roads are constructed over which the camps can  
3 then be transported to the compressor station sites,  
4 and it is questionable that sufficient time will be  
5 available in which to install the camps and facilities  
6 by the time that they are required to be occupied.



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In Chief

Q Mr. Byers, were the amended construction procedures evaluated by the Foothills Environmental Department?

WITNESS BYERS:

A Yes, the amendments were evaluated "in house" during the early stages of their development. This was done by using existing data and reports relevant to the activities and geographic areas of concern. Subsequent meetings were held with our environmental consultants in order to discuss the possible implications of the various amendments.

Q What measures were then taken to detail any site specific environmental implications associated with the amendments ?

A The amendments were evaluated by our consultants according to three categories of impact: physical, biological and special considerations. Using this input, a report entitled: "Environmental Implications of Foothills Project Amendments," was prepared. The report has been submitted to this Inquiry in the form of Appendix E.

Q Does this report represent Foothills final considerations of these amendments?

A This report represents our current stand on the project amendments. I must emphasize that these amendments will receive the same extensive final design environmental assessment and planning as required for all other aspects of the project.

MR. HOLLINGWORTH: Sir, that





Mirosh, Byers  
In Chief

1 concludes the evidence in chief of this panel and  
2 I would ask that their evidence, along with the five  
3 appendices to it, be filed as an exhibit before the  
4 Inquiry.

5 Mr. Byers and Mr. Mirosh are  
6 available for cross-examination. I anticipate Mr.  
7 Kosten's arrival any minute.

8 MR. GOUDGE: Sir, I wonder if  
9 we might just take five minutes to stretch our legs?  
10 I know it's early in the morning, but I think with  
11 five minutes we may be able to constitute this panel  
12 fully and we can then --

13 THE COMMISSIONER: O.K., I  
14 think before we adjourn that I see we have some  
15 students in the hall, and I might just tell you what  
16 this is all about because you may be wondering right  
17 at the moment what these gentlemen are saying to  
18 each other.

19 But you have to be here for  
20 a few months to get the drift. There are two companies  
21 that want to build this pipeline from the Arctic  
22 Ocean along the Mackenzie Valley and then to Southern  
23 Canada and the United States, and these two gentlemen  
24 at the table, one wearing a very smart looking blue  
25 suit and the other with a beard and no suit, they  
26 represent Arctic Gas. That's one company. This gentle-  
27 man taking a glass of water in the front row represents  
28 Foothills, the other company.

29 Right now today these companies  
30 are arguing about whether you can build a pipeline in



Mirosh, Byers  
In Chief

1 the wintertime up on the Arctic coast or whether  
2 you've got to build it in the summer because it's  
3 too cold to work outdoors in the winter, that is in  
4 December and in January. Up there it gets colder than  
5 it does here in Yellowknife.

6                                 These two gentlemen, one is  
7 an engineer and the other is an environmentalist,  
8 and they're explaining why they think that you can't  
9 work up there in the middle of winter. These gentlemen  
10 sitting here, distinguished looking gentlemen , I  
11 believe, are probably here to tell me that these two  
12 don't know what they're talking about, that you can  
13 work up there in the middle of winter, and that if  
14 you do this thing right you can go up there and you  
15 can have a construction spread and hundreds of men  
16 can keep on working when it gets very cold and dark,  
17 right through Christmas and January, and that's what  
18 the fight is about this morning, and we -- I should  
19 say that this gentleman sitting right below me with  
20 the brown jacket and the beard represents the  
21 Committee for Original People's Entitlement, and this  
22 gentleman over here in the check jacket is Commission  
23 counsel. He's my lawyer. I need a lawyer myself with  
24 all these others surrounding me. The people at the  
25 table to my left, far left, are Mr. Whit Fraser and  
26 Mr. Sitichinli of the C.B.C., who broadcast each day  
27 from the Inquiry; and the two young ladies who are  
28 using this mask apparatus right in front of me are  
29 simply recording on tape everything that is said here  
30 so that when it all ends I can sit down and read it





Mirosh , Byers  
In Chief

1 and remember what everybody said.

2 So that's probably about -- I  
3 hope that that is what's happening today.

4 So I think we'll take a few  
5 minutes off for a cup of coffee.

6 (QUALIFICATIONS & EVIDENCE OF MESSRS. MIROSH,  
7 KOSTEN & BYERS MARKED EXHIBIT 841)

8 (THERMAL ANALYSIS OF GRAVEL PAD BY E.B.A.

9 ENGINEERING CONSULTANTS MARKED EXHIBIT 842)

10 (WARM WATER TESTING, SPREAD 5, MARKED EXHIBIT 843)

11 (ENVIRONMENTAL IMPLICATIONS OF FOOTHILLS PROJECT  
12 AMENDMENTS MARKED EXHIBIT 844)

13  
14 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)  
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Mirosh, Byers, Kosten  
Cross-Exam by Bayly

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: Are we  
ready to begin?

MR. GOUDGE: Yes, I think we  
are sir. Mr. Veale of the Council of Yukon Indians  
indicated to me that he had no questions of this panel.  
I'd ask Mr. Bayly of the Committee of Original People's  
Entitlement to commence the cross-examination.

W. G. KOSTEN, resumed:

CROSS-EXAMINATION BY MR. BAYLY:

Q Mr. Mirosh, you refer  
in your evidence on the first page to the use of gravel  
pads as a construction surface on the northernmost  
fifty miles of the Foothills' pipeline, and you have  
in Appendix A, I believe it is, Appendix on the gravel  
in any event, given us some idea of the available  
granular material.

Now, one of the things that  
we have heard from both Dr. Mollard and the Foothills  
panel on the availability of granular materials is  
that that first fifty miles is one in which there is  
a) not a great deal of granular material, and; b) a  
great deal of potential competition for the available  
material. If I can just suggest to you some of the  
uses that we have heard for the gravel as potential  
uses. We heard that the people who want to construct  
a road from Inuvik to Tuktoyaktuk want to use some.

We've heard that the applicants  
for the gas plant facilities want to use gravel. We've  
heard that the constructors of the Arctic offshore



Mirosh, Byers, Kosten  
Cross-Exam by Bayly

1 islands, the drillpad islands, want to use some of the  
2 gravel that is available there.

3 Now, what I'm concerned is  
4 first of all, is this going to involve either you or  
5 somebody else filing material from alternate sites for  
6 the ones that you refer to in the Appendix?

7 WITNESS MIROSH: Well, I'm  
8 not sure how to answer you on that, except to say  
9 that our advice from our consultants in borrow material  
10 is that there is sufficient material in that area,  
11 not only for our project but for other projects and  
12 that it is of a high quality. So, in that sense, I  
13 think that competition for the material probably will  
14 not deplete it but I can't really be more quantitative  
15 than that.

16 Q Well, would you be taking  
17 gravel from the Yaya Lake esker?

18 A Well, we've indicated  
19 three pits. Pit 219, 222 and 319, which are referred  
20 to in our alignment sheets and just a minute. Well,  
21 we're not sure, but 222 may be in the Yaya esker.

22 Q Now, would it be possible  
23 for you to build this section of your pipeline from a  
24 permanent road if there turned out to be one from  
25 Tuktoyaktuk to Inuvik, that being a possible way to  
26 save granular materials?

27 A Well, I would think not  
28 because the reason for the granular work pad is so that  
29 we could be over the ditch line in the summertime.

30 Q I don't understand why





Mirosh, Byers, Kosten  
Cross-Exam by Bayly

1 that creates a problem if the plan is to build a  
2 permanent road from Tuk to Inuvik. It doesn't disappear  
3 in the summertime surely, hopefully anyway.

4 A Well, if the permanent  
5 road were to be exactly over the right-of-way of the  
6 pipeline, then that may be possible but there would have  
7 to be different design considerations for the pipeline;  
8 but if the permanent road you're speaking of is not  
9 aligned with the pipeline, then we would not be able  
10 to carry out construction activities during the warmer  
11 period of time. That's the main reason for the granular  
12 pad, is to protect the--

13 Q Right. I understand that.  
14 I'm just asking about the possibility in the event that  
15 you and the government could get together and create  
16 an identical alignment for the two facilities to save  
17 granular materials. You say it could be done, provided  
18 they would agree to the alignment that you want to  
19 use for the pipeline?

20 A Well, I'm saying it  
21 could be done but design considerations would have to  
22 be looked at. We'd have to go to a different code  
23 classification for pipe and talk with the Highways  
24 Department about distances of separation of the pipe  
25 from the centerline of the highway and so on.

26 I guess conceptually I'm  
27 saying it could be done, but I don't know how practical  
28 it would be.

29 Q Right. What can you do  
30 to give the gravel back when you finish using the gravel



Mirosh, Byers, Kosten  
Cross-Exam by Bayly

1 pad to lay the pipe?

2 A Well, our plan is to leave  
3 the gravel in place, and not to move it back to the  
4 borrow pits. So, we have no plan to give it back to  
5 the borrow pits, if that was your question.

6 Q Do you think you'll be  
7 able to control access on that road that you will have  
8 created?

9 A Well, I think it's  
10 important to understand it won't be a road. We intend  
11 to, upon installation of the pipeline, to pull up the  
12 culverts, to allow natural drainage to continue where  
13 natural drainage courses now exist. Our intention is  
14 not to use that gravel pad for regular access.

15 In fact, the way we visualize  
16 it, it will probably not be useable in the summertime  
17 due to the fact that there will be these drainages.  
18 So, it's not a road after construction. It's a work  
19 pad during construction only.

20 Q Have you cost it out to  
21 see whether it would be cheaper to make it a road so  
22 that you could inspect and maintain your pipeline  
23 facility in the first fifty miles by the use of ground  
24 transportation all year round?

25 A No, we haven't. In that  
26 particular area, it probably wouldn't be of a great  
27 advantage to us for only a short segment of our  
28 pipeline to have ground access because at the present  
29 time, there would be no easy way to get up to the fifty  
30 mile point where the pad starts.





Mirosh, Byers, Kosten  
Cross-Exam by Bayly

1 THE COMMISSIONER: This pad--

2 A Pad.

3 Q Isn't this a bit of  
4 semantics, and this is going to serve the same purpose  
5 as far as the construction of the first fifty miles  
6 is concerned as a whole road would. Have I got this  
7 right?

8 A Yes, for construction  
9 purposes, that's true.



Mirosh, Byers, Kosten  
Cross-Exam by Bayly

1 MR. BAYLY: Q Now is that --  
2 I'm looking at the diagram at the back of your gravel  
3 work pad information and I see reference there to a  
4 one and a half inch HI-60 styrofoam. Is that a sheet  
5 of styrofoam on top of the gravel, is that what that  
6 refers to?

7 A Yes, that would be sheet  
8 styrofoam.

9 Q And I take it that that  
10 would be removed following the construction, would it?

11 A No, that would remain  
12 in place.

13 Q How is that anchored?

14 A Well there's a cross  
15 sectional drawing shown --

16 Q I've got that.

17 A -- with our report and  
18 there is a lift of gravel compacted pit run gravel  
19 on top of the styrofoam. In other words, there's  
20 twelve -- there's twelve inches of fine granular mater-  
21 ial over the tundra then there's the sheet styrofoam,  
22 then there's approximately two feet of pit run on top  
23 of that.

24 Q And that's -- and that  
25 is on a pad 60 feet wide?

26 A Right.

27 Q And that according to  
28 your calculations comes out to 1,750,000 cubic yards  
29 to the 50 miles?

30 A Yes, if that's the



Mirosh, Byers, Kosten  
Cross-Exam by Bayly

1 number in our report -- did you read that number from  
2 our report?

3 Q Yes I read that from the  
4 report, under Item 4. Now in order to maintain that  
5 surface if you do use it even for -- for winter travel  
6 what sort of quantities would you be looking for to  
7 maintain that gravel pad?

8 A Maintain for operating  
9 purposes?

10 Q Well you say that --  
11 you said that in one of your earlier answers, you  
12 could not use this pad in the summer time because you  
13 would pull out the culverts to allow a natural drain-  
14 age.

15 A Yes.

16 Q I assume from that you  
17 would be using it at some seasons of the year and I  
18 want to know if you plan to maintain it so you can do  
19 that and if so, how much granular material you will  
20 require to maintain that surface.

21 A No, there's no intent to --  
22 to maintain the pad. It will be allowed to return to  
23 a natural state and obviously if there was some repair  
24 activities in that section, we -- we may elect to use  
25 the pad to access the point of repair, we may not.  
26 The intent is only to really make use of the pad for  
27 construction purposes.

28 Q If you were to loop your  
29 facility at some point, would you contemplate using  
30 this gravel pad as the work surface?





Mirosh, Byers, Kosten  
Cross-Exam by Bayly

1 A Yes, I'm sure we would.

2 Q And if you did that, I  
3 take it, you'd need additional granular material to  
4 put it back into condition so you could use it for  
5 a work surface?

6 A Well we may need to make  
7 it wider, so we may need additional granular material  
8 in that way. We may need to -- we may need to put  
9 granular material on places where it may have eroded,  
10 that's true, but, that's not part of our current plan  
11 and if looping did enter into the plan, then we would  
12 have to look at that, yes.

13 Q So you haven't checked  
14 to see how much wider you would think that the work  
15 pad would have to be and therefore how much more  
16 materials you think you would require in the event of  
17 looping?

18 A No, we haven't looked  
19 at that yet.

20 Q Now your basic thesis  
21 is, that the weather is too severe to successfully  
22 construct this 50 mile portion in the winter time and  
23 that is why you would seek to do this in the milder  
24 weather?

25 A Yes, the weather is too  
26 severe and the time window that we calculate. We have  
27 to work in that area just does not allow us to carry  
28 out the construction activities.

29 Q All right. Now we have  
30 heard at various times that Foothills does not plan to



Mirosh, Byers, Kosten  
Cross-Exam by Bayly

1 cross the north slope to pick up anybody elses gas  
2 that might be along there, but, we have heard that if  
3 required to do so, they would consider it. If you  
4 were considering working on the north slope, would  
5 you say that you would have to do it in the summer  
6 time from a gravel pad.

7 A I think our current  
8 thinking would lead us to that conclusion. We would  
9 very likely look at the granular pad along the coast  
10 across the Delta as a working surface because in our  
11 opinion we would very likely have to get in there in  
12 the fall for construction.

13 Q All right. Those are  
14 all the questions I have. Thank you very much.

15 MR. GOUDGE: Mr. Steeves of  
16 Canadian Arctic Gas.

17 MR. STEEVES: Mr. Commissioner  
18 I wanted to have a word with Mr. Dau about some work I  
19 asked him to do for me on this evidence. I wonder -- I'm  
20 quite prepared to proceed now and I might like to get  
21 back to the panel later after I've had an oppor-  
22 tunity of speaking to Mr. Dau.

23 THE COMMISSIONER: Mr. Dau,  
24 do you want to break now?

25 MR. STEEVES: No, I would --  
26 I'm quite prepared to proceed. Mr. Dau came in on a  
27 plane this morning and I'm sure I'll find an opportunity  
28 to speak to him.

29 THE COMMISSIONER: Well, what  
30 ever you like.





Mirosh, Byers, Kosten  
Cross-Exam by Mr. Steeves

1 There's only one week of hearings left, I'll agree to  
2 anything.

3 CROSS-EXAMINATION BY MR. STEEVES:

4 MR. STEEVES: I'm really  
5 starting to move now.

6 Q Mr. Mirosh, I was in-  
7 terested -- would you tell me the difference in engin-  
8 eering terms between a gravel pad and a gravel road?

9 A Well they'd both be the  
10 same. Certainly a gravel pad during the construction  
11 of this 50 miles is a gravel road, primarily because  
12 the drainage courses are bridged and access is avail-  
13 able along the 50 miles for vehicles. In that sense  
14 it would be a road when the drainage courses are opened  
15 the pad is not a road, because access is not necessarily  
16 available across that pad, especially in the summer  
17 time.

18 Q Well I heard you say,  
19 I think, that after construction you were going to  
20 allow this gravel road to return to its natural state.

21 A Yes, the gravel pad.

22 Q And I take it you mean  
23 by that, that you're going to allow the gravel road  
24 to eventually become covered with vegetation, is that  
25 right?

26 A The gravel pad will be  
27 allowed to return a natural state, yes.

28 Q How long will that take?

29 A Probably begin as soon  
30 as we're finished using it.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

Q How long will it take  
for this gravel road to return to a natural state?

A It's in a natural state  
when we finish with it.

Q I'm sorry. Let's get  
back to what a natural state means.

A Okay.

Q What do you mean by  
natural state?

A Well we plan on not  
maintaining the road, therefore, weather conditions  
and erosion and atmospheric conditions will work on  
this road. It will be let's say in harmony with  
nature after we're finished with it.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

Q Well, does nature now show a strip of gravel running along this alignment sheet? Is that what you're telling me?

A No, but I'm saying after we're through with it, it will be allowed to become part of the terrain, a natural part.

Q And you're telling me that eventually it will go back to the state it was in before you put the road in, is my understanding correct?

A Yes, it may. It may well erode and become less of a three-foot obstruction, shall we say, during the course of summer thaws the edges of the pad may well slump, yes. It will begin returning to its natural state.

Q Will the ground covered by this gravel road ever return to the state it was in before you put the road on it?

A No. The surface of the ground underneath the gravel pad will obviously have the pad on top of it.

Q And that is for an indefinite period, is it?

A Yes.

Q You have no idea, it may be there forever.

A Yes.

Q O.K. What have your environmentalists told you about the effect of putting a permanent gravel road, or a gravel pad, along this





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 50 miles of the alignment?

2 A Well, they were quite  
3 concerned primarily about drainage. They were also  
4 concerned about timing of construction related to  
5 waterfowl migration. We were --

6 Q Sorry, I'm not being  
7 precise enough. What do your environmentalists say  
8 about the environmental effect after construction is  
9 completed and after you abandon this road?

10 A Nothing. As long as  
11 we take care to ensure that natural drainage is  
12 allowed to be maintained as it had earlier, my under-  
13 standing is that their position was the gravel pad  
14 would be a suitable technique, in their opinion.

15 Q "My understanding", you  
16 mean someone mentioned that to you, or was there a  
17 study done?

18 A Yes, there's a study  
19 appended to the evidence.

20 Q Is that it?

21 A Yes.

22 Q Will you direct my  
23 attention to where in that study the problem -- I'm  
24 sorry, where in that study an analysis is made of the  
25 effects, long-term effects of the existence of this  
26 gravel road after construction is finished? Perhaps  
27 one of your assistants could help you.

28 A Well, first of all I  
29 suppose your point is that an analysis, some sort of  
30 a computer model is necessary to determine the long-



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 term effects. If that's your question, we have not  
2 done this.

3 Q I don't want to get  
4 into computers. What have computers got to do with it?

5 A Well, it did help us  
6 assess the fact that a gravel pad would be a suitable  
7 technique. We had to carry out geothermal studies,  
8 which were short-term effects.

9 Q O.K.

10 A But there is a section  
11 in the report which is appended here on the gravel  
12 pad --

13 THE COMMISSIONER: Q By  
14 "gravel pad", which one are you referring to?

15 A Well, I think it's the  
16 environmental report which is of concern to Mr. Steeves.  
17 Page 35.

18 MR. STEEVES: That's the one  
19 with the cover printed rather than -- I think it's  
20 this one.

21 "Environmental implications of Foothills  
22 Project Amendments."

23 A Yes, that's the one.

24 Q Are you going to direct  
25 my attention to the place in that report where the  
26 long-term environmental implications of the existence  
27 of this gravel road after construction are analyzed?

28 A Yes, page 35 does have  
29 one long-term effect which probably is of interest to  
30 you, That's the visual impact.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q You talk about the  
2 styrofoam blowing in the wind.

3 A Oh, that's a definite  
4 problem, yes.

5 Q Well, is that the only  
6 aspect of long-term environmental impact that was  
7 studied by you?

8 WITNESS BYERS: Ed, maybe I  
9 can be of some assistance.

10 Q Could you assist him?  
11 I would appreciate it.

12 A First of all, yes, we  
13 did have some reservations about a gravel pad, as  
14 you say, leaving a strip where there wasn't one  
15 before.

16 Q I'm sorry. Would you  
17 mind turning your mike a little bit? There's been  
18 so much shouting in here I'm losing my hearing.

19 A You introduced it by  
20 suggesting that perhaps we were going to introduce  
21 a strip where there wasn't one before along the  
22 ground surface of Richards Island. Yes, we have  
23 given that a great deal of consideration. Perhaps  
24 visual impact doesn't answer your question. We did  
25 feel, however, that as Mr. Mirosh said, if we could  
26 ensure the stipulations to guarantee adequate drainage  
27 and the existing physical condition that is there,  
28 that perhaps it would be of more damage to take it  
29 one step further than go back and try to pick up this  
30 gravel and this material that we're introducing to the





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1 ground surface, than it would be to leave it there  
2 and allow nature to take its course. You have to  
3 realize that the use of the styrofoam, the use of  
4 the gravel is there to maintain that insulation layer  
5 for the construction period, and also to assist  
6 in the stabilization of that area after.

7 Now, if you go along and  
8 remove this gravel pad which will have compressed  
9 the ground surface because of its pure existence, you  
10 go along there and remove that gravel pad you're  
11 introducing a problem apart from just the pipeline  
12 activity, you're introducing a wider strip than was  
13 normally considered. So we felt that because this  
14 is going to provide insulating capacity, it's going  
15 to ensure the integrity of first of all the pipeline,  
16 and secondly the thermal base that we're working on,  
17 it would be better to leave the gravel pad there and  
18 accept it as a condition.

19 Now it's naturally going to  
20 return to an approximation to a situation that perhaps  
21 to some people won't be acceptable on Richards Island,  
22 but we felt in this case it was necessary to accept  
23 that consequence.

24 Q Well, do I understand  
25 it, it's like this. It will be an environmental  
26 impact by the mere construction of this road. It  
27 will be an environmental impact by the continued  
28 existence of this road after construction. That  
29 fact, although negative, will not be as negative in  
30 the long term as it would be if you tried to remove  
the road.



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Cross-Exam by Steeves

A Yes.

Q We've had it in evidence here many times when we're talking about the North Slope and in fact, we had it the other day when we were listing new evidence about transportation corridors but one thing that all environmentalists agree on is that a road should never be built along the North Slope.

A Well, I think perhaps maybe you should--

Q Can I just finish the question. Do you agree or disagree with that statement?

A Yes, a road should never be built along the North Slope.

Q If you are requested, as I think it's been put, to connect up, assuming you get a certificate and a permit right away, and you're asked to connect up to Prudhoe Bay, as I understand Mr. Mirosh's evidence, you can't build there in the winter, so you're going to have to build in the summer and you're going to have to build a gravel road or pad. Now, am I following right so far?

A Well, first of all I think I'll have to take exception with--go back to a few things. First of all, my terms of reference have not been to deal with a potential of a gravel road or pad across the North Slope of the Yukon. The realization or the terms of reference we were given were that working within the time period our construction people had to work with, they felt that it was not possible for them to try and work on a snow road in the weather conditions that would be in evidence on the North Slope



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 at the extended coastal plain which you can find at  
2 Richards Island.

3 Now, a consideration for what  
4 might be done across the North Slope of the Yukon by  
5 our environmental department would first require us  
6 to go back right to the beginning and establish the  
7 time period within which we would have to work. Now,  
8 that is the criteria that I understand that we're  
9 dealing with for a gravel pad here, within the con-  
10 struction period we're wanting to work into, a gravel  
11 pad became perhaps an alternative to an existing  
12 winter program.

13 So, in our reference to the  
14 Richards Island situation, we felt this was going  
15 against something which we had originally considered  
16 and that is winter construction. So, we felt what is  
17 our next option to us? The environmental people that  
18 we consulted said you're dealing with some pretty  
19 significant environmental problems there. Waterfowl  
20 activity on the outer coastal--of the outer edge of the  
21 delta. So, we should then go back and look at the  
22 best period that we could be working there and this is  
23 where we considered the fall.

24 Now, in terms of extrapolating  
25 and taking that and saying, yes, we would have to opt  
26 to a construction gravel pad on the North Slope of the  
27 Yukon, I can't comment on that at all.

28 Q Will the construction of  
29 a gravel pad or road across the North Slope through  
30 to Prudhoe Bay be a disaster, or not?





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 A I don't know.

2 Q You have no idea?

3 A No.

4 Q Well, do you agree or  
5 disagree with the evidence that I have quoted to you  
6 that under no circumstances should a road be built from  
7 the delta over to Prudhoe Bay along the North Slope?

8 A Yes.

9 Q You agree?

10 A Yes, I do.

11 Q Why do you agree with  
12 that, because of the consequences of building a road?

13 A I believe, as I understand  
14 it, even people from--certain biologists working with  
15 your company have suggested that there will be problems  
16 because of the activity and the increased access, that  
17 may be in evidence across the North Slope. Now, if  
18 you want to do a comparison, I think perhaps--

19 Q Excuse me. I'd like  
20 to know what your personal, what your own opinion  
21 is. Do you have an opinion about the construction--

22 MR. HOLLINGWORTH: Well, the  
23 witness was in the middle of answering the question,  
24 Mr. Steeves.

25 MR. STEEVES: Yes, but he  
26 wasn't answering the question, with respect.

27 THE COMMISSIONER: Can I  
28 just slow everybody down for a minute. Let me just tell  
29 you, Mr. Byers, what I'm concerned about, because maybe  
30 Mr. Kosten and Mr. Mirosh would like to comment on this,



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Cross-Exam by Steeves

1 in due course, after Mr. Steeves is through with you.

2 This evidence that Mr. Kosten  
3 prepared and Mr. Mirosh read this morning goes to one  
4 of the critical issues before this Inquiry. You see,  
5 if you people are right, and it is too cold to build  
6 your fifty mile stretch from Taglu south in winter,  
7 then you're going to have to do it in summer and I  
8 would think that if you are right about that, then the  
9 same thing goes for the North Slope, for Arctic Gas's  
10 Prudhoe Bay supply lake.

11 So, if you can't build that  
12 supply lake along the north coast in summer--in winter,  
13 you're going to have to build it in summer. Now, that  
14 is two consequences. The first is, if you build it  
15 in the summertime, you are impinging on the North Slope  
16 at a time of year the environmentalists have said you  
17 should stay out, because essentially of caribou and  
18 birds.

19 But there's another thing.  
20 You can't build it on snow roads in summer because  
21 there isn't any snow and you'll sink into the ground,--

22 MR. STEEVES: Into the active  
23 layer.

24 THE COMMISSIONER: --into the  
25 active layer, right, unless you build this gravel  
26 strip. Let's get away from this road pad stuff. Let's  
27 call it a gravel strip. Now, once you have a gravel  
28 strip installed there, you have a long-term danger.  
29 In addition to construction over one or two summers on  
30 the critical habitat itself, you have the long-term



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1 danger, we have been told, that that thing will become  
2 a public highway and you will have the uncontrolled  
3 presence of man and we have been advised by people who  
4 claim to know what they're talking about, that that  
5 in the long run means the extirpation certainly of  
6 the caribou herd because it will drive them from their  
7 calving grounds.

8 Now, I'm just repeating this  
9 for the benefit of everybody so you understand what  
10 I'm concerned about here and so that if I haven't  
11 got this right, you can call somebody to tell me or--  
12 that's the issue. So, carry on, Mr. Steeves, but bear  
13 in mind, you've got an opinion on that. If you have  
14 something to say about that, I'd like to hear it.

15 A Well, as I said, we're  
16 really quite concerned and I can agree that a gravel  
17 pad anywhere in the north in the area has significant  
18 potential repercussions to everyone. Our consulting  
19 people, you know, we had a great many discussions with  
20 them concerning this fact and we felt that if we could  
21 ensure that the major drainage areas and the major  
22 water courses that would have to be crossed for each  
23 of these activities could be returned to approximately  
24 normal with appropriate design measures to ensure--  
25 prevent erosion and maintain the area. We felt that  
26 that would be one way that might result in people not  
27 thinking this was a--you know, you couldn't take your  
28 car then and just drive along this thing to have a  
29 scenic drive anywhere north of Inuvik.

30 Secondly, an interesting point





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1 was brought up by one of our vegetation people that  
2 perhaps something that we should look at too and the  
3 idea that work increased activity or development in  
4 an area like Inuvik, our gravel pad, which was only  
5 coming to mile fifty, would be away from Inuvik but  
6 if people want to and they know that there's a pad  
7 to extend a little bit farther, with the increasing  
8 availability of four wheel drive vehicles and things  
9 like that, there is no way that we can control activities  
10 onto the tundra out of Inuvik as people wish to do so.

11 Now, as a consequence, if they  
12 were then able to make it to our gravel pad, the next  
13 option would be that we would have had to construct  
14 a large fence somewhere across that whole area to  
15 prevent them from going further, because even though  
16 you did take out your drainage courses, if a person  
17 has it in his mind to go to a place like that, there  
18 would be nothing stopping him then, because he'd already  
19 crossed significant drainage areas and problem areas  
20 that we hope to alleviate when we put in our gravel  
21 pads.

22 So, perhaps we don't have an  
23 answer and that is one reason why intentionally we  
24 have called this environmental implications of the  
25 amendments and we've called these things reaction  
26 measures and I really must emphasize and perhaps this  
27 is something you've heard too often, but we consider  
28 this something that we are going to have to deal with,  
29 these kind of concerns, and we are still working on  
30 these kind of things and at this stage in the game, we  
don't know what the answer is.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1  
2 THE COMMISSIONER: All right,  
3 carry on.

4 MR. STEEVES: Thank you, sir.

5 Q Let me keep going, if  
6 I may. You don't know the answer to the environmental  
7 implication that a construction --

8 A No -- I'm sorry.

9 Q -- go ahead, I don't mind.

10 A No, no. You were  
11 interested, as I understand it, on the long-term  
12 repercussions of this gravel pad and no, we have to  
13 accept that that gravel pad is going to be there  
14 because we felt it would cause too much damage to try  
15 and pick it up and return this area to what it had  
16 been originally. So you know, we realize that there  
17 is a problem but on the long-term we don't know, I  
18 don't know how we're, you know, what we're going to  
19 be able to do with it ,on a long-term basis. On a  
20 short-term basis we are require that they try to  
21 maintain drainage courses and the existing problem  
22 areas that are considered to be a problem with a  
23 gravel berm or anything over the pipeline anywhere  
24 along the whole valley. These are the things that  
25 we're dealing with at this stage of the game.

26 Q You don't know, am I  
27 correct in understanding you to be saying this, you  
28 the environmental consultant or director of Foothills  
29 Pipe LInes, do not know the long-term environmental  
30 implications of the construction of this gravel pad



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through this 50-mile stretch.

A Well, I think --

Q Is that what your  
evidence is?

A No.

Q O.K. Explain to me what  
you're saying.

A First of all, I'm only  
the co-ordinator and I'm not a director or consultant  
to Foothills Pipe Lines, for the environmental aspects;  
and secondly, I think this started off originally in  
terms of the consequence of this gravel strip along  
Richards Island aesthetically or otherwise. We have  
given you the concerns of our consulting people, the  
reactions that we've felt we had to deal with, and  
these things, if you read, I believe by one of our  
geotechnical people has commented that the gravel pad  
dealing with that for a drainage concern would be  
similar to dealing with the berm over the pipe.

We felt then that these were the things erosion-wise,  
drainage-wise that we were going to have to deal with.

Now, a long-term impact of  
that gravel pad, if somebody can tell us what that  
is going to be, what it's going to open up, what it's  
going to develop into, I think we would be most eager  
to hear what they have to say about it. This --

Q Sorry, I beg your pardon.

A -- as I said as well in  
my evidence, we still feel that we have to do more  
studies. We just can't accept this document as our





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1 final say on this thing. We realize there are reper-  
2 cussions and problems we may have to deal with.

3 Q Well, would you turn,  
4 please, to the preface to environmental implications  
5 of Foothills project amendments? Do you accept joint  
6 or personal responsibility for this document?

7 A Yes, I do.

8 Q O.K. Can I direct your  
9 attention to the middle of the first page, which is  
10 called, "Preface", and you're telling us here about  
11 how items 1, 2, 3, 4 above, and 4 is this:

12 "To construct the northerly 50 miles of mainline  
13 during the summer and fall periods using a  
14 gravel pad as opposed to winter construction  
15 from snow roads."

16 And then you go on and you tell us about the discussions  
17 you had with the various departments of Foothills, I  
18 guess, and then you say this:

19 "When it had been determined that the major  
20 environmental concerns could be obviated,  
21 the amendments were endorsed in principle  
22 by the Environmental Affairs Department."

23 Is that a true statement?

24 A Yes, it is.

25 Q You have determined or  
26 your department has determined that the major environ-  
27 mental concerns could be obviated.

28 A Yes, and a major  
29 environmental concern, we felt, was a problem if some-  
30 body requested us to pick the gravel up after we had



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 put it down. For our terms of reference, that would  
2 be a major environmental concern.

3 Q Well, would you identify  
4 for me, please, the major environmental concern in  
5 the long-term from the existence of this gravel road  
6 along the 50-mile stretch? Let's start there. Do  
7 you know what they are or not?

8 A Well, as I said --

9 Q Do you know what they  
10 are?

11 A Well, I think I do.

12 Q O.K.

13 A Perhaps you have a  
14 different opinion on this, but I feel or we felt,  
15 rather, that the consequence of this gravel pad, the  
16 major environmental concerns that were associated  
17 with that were ensuring that because the pad was  
18 going to be there, that we had to deal with problems  
19 of erosion, drainage, potential -- I guess I don't know  
20 what the word is -- the potential aspects of that  
21 pad might be erosion or drainage consequences that  
22 that pad might affect certain aquatic habitat areas  
23 around there. These were the things that we looked at  
24 as a consequence of the pad, and as I said, I agree  
25 with you that that pad is going to be there and it  
26 is going to be a long-term structure; but as to  
27 evaluating sometime in the future what the major  
28 consequence of that thing is, we don't know at this  
29 time and that's why we feel we have to keep looking  
30 at it.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Now, the other side of that  
2 coin is that more of a major environmental impact to  
3 turn around and try to pick that gravel up after we've  
4 put it down, or is it easier to try and deal with  
5 some of these things like drainage and leave the pad  
6 where it is?

7 Q When did you determine  
8 or when did Foothills determine that the major environ-  
9 mental concerns could be obviated? Could you give  
10 me a date, please?

11 A No, I'm not exactly  
12 sure. We've been working on this report for a long  
13 time. I would think sometime in the spring.

14 Q Was that your decision,  
15 or a committee decision?

16 A This was a decision  
17 that we did in consultation with our consultant  
18 people and the people we have on staff with us.  
19 Not on-staff, excuse me.

20 Q Who was there? Do you  
21 remember the meeting, sir, when this decision was  
22 made?

23 A Well, there was a number  
24 of meetings but we used as our consultant group the  
25 Lombard North group people. We had our geotechnical  
26 people with us. We had<sup>our</sup> revegetation people with us.  
27 We considered it with our aesthetics people. We  
28 considered it with the consultants we had used in  
29 support of our environmental work on the Maple Leaf  
30 Line.





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q Who were your aesthetics  
2 people?

3 A A man by the name of  
4 Jim Taylor, who appeared before this Inquiry as part  
5 of our physical panel in approximately November of  
6 last year. He works for the Lombard North group from  
7 Calgary.

8 Q Mr. Mirosh, are you  
9 prepared to try and build, if you're asked to do so,  
10 a leg from the delta to Prudhoe Bay along the North  
11 Slope in the summer? I understood you to say a  
12 few minutes ago that you were.

13 WITNESS MIROSH: No, I think --

14 Q Are you prepared to do  
15 it?

16 A -- what I said was we'd  
17 have to look at it, and the present conclusions that  
18 we would draw is that it would likely have to be done  
19 in our opinion from a gravel pad in the fall. Now  
20 I'm not saying I'm prepared to do it, but if there  
21 is no other way, in our opinion, to cost effectively  
22 build it, then that would have to be a recommendation  
23 we may make.

24 Q Well, it seems --

25 A Now that may be at  
26 odds with the environmental people, I admit.

27 Q Maybe?

28 A Maybe, yes.

29 Q Maybe?

30 A Well, we haven't studied



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 it yet. You know, that's not part of our plan, but if  
2 we were asked to do it we'd obviously study it.  
3 We may find that there is a dilemma such as other  
4 people may have.

5 Q I want to go back to  
6 you, Mr. Byers, because I want to make sure I understand  
7 what you're saying. Would you look at the preface --

8 WITNESS BYERS: I have it here.

9 Q O.K. Would you read that  
10 out, please, starting "at the same time." Do you see  
11 that sentence, "at the same time"?

12 A oh, excuse me, I'm  
13 sorry.

14 "At the same time the Environmental Affairs  
15 Department met with its various physical and  
16 biological consultants for the purpose of  
17 reviewing the proposed amendment and identifying  
18 the associated environmental implications. When  
19 it had been determined that the major environ-  
20 mental concerns could be obviated, the amend-  
21 ments were endorsed in principle by the Envir-  
22 onmental Affairs Department."

23 Q O.K.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q Did you ever write down  
2 the associated environmental implication that you had  
3 identified, why can't you give me a list of them now?  
4 Really it's like --

5 A I thought I had -- had  
6 done that.

7 Q Oh, have you?

8 A That it is represented  
9 by the people that haven't been involved in this  
10 report.

11 Q You mean, don't try and  
12 dig the road up after construction has finished be-  
13 cause it will make a worse mess than if you leave it  
14 there, is that it?

15 WITNESS MIROSH: This is what  
16 we've addressed. That is the major --

17 MR. STEEVES: I'm sorry,  
18 could Mr. Byers answer the question first and then --

19 A Well I'm just trying to  
20 help you out by giving you some answers.

21 MR. STEEVES: Well he was  
22 interrupted by Mr. Mirosh I think.

23 THE COMMISSIONER: Come on  
24 now. Come on, let's pull ourselves together. I  
25 think Mr. Byers, you should answer Mr. Steeve's  
26 question and then Mr. Mirosh should comment on the  
27 matter.

28 WITNESS BYERS: When we first --  
29 first considered the aspect of a gravel pad, we first  
30 of all --





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 THE COMMISSIONER: Excuse  
2 me Mr. Byers, what was said was, the environmental  
3 concerns that you dealt with included these, you said  
4 well, this is what Mr. Steeves is putting to you.  
5 It will be a bigger mess to dig this gravel up over  
6 this 50 mile stretch than it would be to leave it  
7 there. Now a judgment was made about that, that's  
8 the advice you gave. Were there any other important  
9 environmental considerations that had to be dealt  
10 with in the same way that that one was dealt with?  
11 I think that's what we're driving at?

12 A Okay. As I said, the  
13 other concerns are -- I just -- on a biological note  
14 referncing the potential problems with dealing with  
15 the major waterfowl area and we considered that and  
16 we then looked at the period that we could work or  
17 we could recommend were construction people, that  
18 they could best build this gravel pad by having the  
19 least amount of impact on the waterfowl activity on  
20 the Richards Island area and that is why we have re-  
21 requested for them to look at developing their gravel  
22 pad or build -- the construction activity rather to  
23 begin approximately sometime after the 15th of August  
24 working from our most southern portion north, so we  
25 would then be getting on to the Richards Island area  
26 at a period that we thought would be perhaps the  
27 least impacting on the waterfowl activity which was  
28 going on there at that time. Meaning, at this fall  
29 period, the waterfowl activity as we understand it is  
30 on the extremities of the Delta when these birds are



Mirosh, Byers, Kosten  
Cross-Exam By Steeves

1 preparing to go south and if we felt that if we could  
2 get our construction people to agree to a working from  
3 the south/north we would then be coming into this area  
4 at a time perhaps near the end of this major waterfowl  
5 concentration activity. That was the one aspect there.

6 We then considered the poten-  
7 tial disruption of aquatic areas in the Mackenzie  
8 Delta which has been identified a number of times  
9 as being a very -- a very important biological area  
10 and for these reasons, we had to insist that if they  
11 were going to use a gravel pad, they should do every-  
12 thing possible to ensure minimal drainage disruption  
13 if necessary and secondly, or perhaps first I guess,  
14 that they should ensure us that they would go to all  
15 extremes to ensure major erosion and drainage control  
16 methods or measures rather, so that we wouldn't be  
17 letting ourselves into erosion and similar situations  
18 into the drainage areas. Let me see now, what else?  
19 I think essentially that was our major approach and  
20 then as you've said Mr. Steeves, we -- we had to deal  
21 with this problem of a gravel pad remaining on Richards  
22 Island, and this is where we dealt and worked with our  
23 geo technical people.

24 MR. STEEVES: I'm sorry, I  
25 just missed that.

26 A We worked with our geo-  
27 technical people. The people that are consulting to  
28 our engineering department as semi to us to look at  
29 the consequence of this gravel pad on Richards Island  
30 and, yes I will accept that it -- that there is a major



Mirosh, Evers, Kosten  
Cross-Exam by Steeves

1 environmental impact by having the pad there, but,  
2 weighing one major environmental impact against another  
3 major environmental impact, we felt, from the best  
4 knowledge that we had, that if we tried to go through  
5 and pick that pad up again, that that perhaps could  
6 lead to a greater consequence than if we left the pad  
7 there and that's how we arrived at our approach on  
8 this thing.

9 Q All right. And the  
10 same reasoning would apply to -- to a gravel road along  
11 the north slope, wouldn't it? Can't you answer that,  
12 why do you back away from that?

13 A Well I think the gravel  
14 road along the north slope, when you consider the  
15 distance the -- to my mind, a more acceptably biologi-  
16 cally sensitive area would require as Mr. Myers said  
17 I would expect a major head-on clash between our  
18 environmental department and our engineering people  
19 and yes, I can accept on your -- on your sort of terms  
20 of reference, that perhaps we would have to go to a  
21 gravel pad, but -- as a environmental person with the  
22 Foothills, I can not say one way or another now which  
23 way we would go, because I think it -- it leads to  
24 something much more significant than a -- than a line  
25 that we're going to be using on the Richards Island  
26 area.

27 THE COMMISSIONER: That's  
28 400 miles to Prudhoe Bay and about 200 miles of that  
29 is within Canada?

30 A Yes sir.





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q : What was  
2 that phrase you used, a more inceptably environmentally  
3 sensitive area, I didn't quite get that?

4 A Well sir, maybe I'm  
5 getting a bit out of my depth here because we haven't  
6 spent a great deal of time sort of documenting all  
7 the environmental concerns on that Yukon Coast, but,  
8 I do understand that there are major caribou activity,  
9 migrations along that area and has a great deal of  
10 potential for snow geese, a very concentrated waterfowl  
11 activity area, things that --

12 Q You're  
13 suggesting that it may well be that the 50 miles from  
14 Taglu south, is not as sensitive in an environmental  
15 sense as the north slope?

16 A I guess if you wanted  
17 to compare one against the other, I should say though,  
18 that -- that we accept that there is a great deal of  
19 sensitivity on Richards Island and that is why we have  
20 requested this construction activity at that period  
21 and for the same reason, the implications of a much  
22 larger line and a much greater area almost make me  
23 shudder I think in the sense that the kind of re-  
24 procussions that what we're agreeing to, or accepting  
25 with reservations on Richards Island, could potentially  
26 happen.

27 Q Okay. There's one thing  
28 I want to know and maybe you explained this, but, you  
29 say here, or Mr. Kosten, you say, sir, pipeline con-  
30 struction would take place during the approximate



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 period of August 15th to August -- to October 31st.  
2 That's pipeline construction, but you've got to get  
3 that gravel pad in there. When would you build the  
4 gravel pad?

5 WITNESS KOSTEN: I'd have  
6 to look at their schedules to be specific about it,  
7 but, I believe most of the activity of Post O we have  
8 here, a construction sequence on -- I believe it's in  
9 this exhibit, mid-October to mid-December --

10 WITNESS MIROSH: This in-  
11 formation is attached on one of the Appendixs by the  
12 way but Mr. Kosten can read the pertinent information  
13 out.

14 WITNESS KOSTEN: We have mid-  
15 January to mid-March here to October to December, year  
16 3, October to December, year 2, pardon me, mid-January  
17 to mid-March, year 3.

18 MR. HOLLINGWORTH: Could I --  
19 could you have the reference?

20 THE COMMISSIONER: Which one  
21 is it in?

22 WITNESS MIROSH: I believe  
23 it's in Appendix -- it's in Appendix B, entitled,  
24 Report on the Proposed Construction of a Gravel Work  
25 Pad and the pages aren't numbered, but, it's the  
26 third page, item 2, called Construction Sequence.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 THE COMMISSIONER: Well, at  
2 any rate, you've answered that. You're in there in the  
3 winter building the gravel pads.

4 A Yes.

5 Q Well, somehow it seems  
6 to me and you might comment on this, Mr. Kosten and  
7 Mr. Mirosh, that you almost go a full circle in that  
8 you say you can't build the pipeline in the winter.  
9 You're going to build in the summer, so you have to  
10 build a gravel pad for summer construction. You're  
11 going to build the gravel pad in the winter.

12 You run into the same problem.  
13 I notice your dates here. You stay out of the mid-  
14 December to mid-January period. But you're running  
15 into the same problem of--if you can't build a pipeline  
16 in the winter, can you build a gravel pad in the winter?  
17 I suppose one is a lot easier to build than the other  
18 but reflect on that for a moment or just comment on  
19 that.

20 WITNESS KOSTEN: This was  
21 discussed with the people that did our earth moving  
22 operation and the gravel pad basically is the develop-  
23 ment of material for building of the pad and in fact,  
24 the procedure here was developed by an earth moving  
25 contractor that we consulted and engaged to work out  
26 the cost and procedure for us and the timing.

27 The dates that they said that  
28 they could do the work in are the dates that they  
29 developed. We did not tell them when, but in our  
30 conclusion on the building of the pipeline, it involves





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 different operations and you're talking about many more  
2 men. The equipment is different. The construction of  
3 a pipeline is not really similar to an earth moving  
4 operation.

5 Q Well, did you say the  
6 earth moving operation falls essentially within the  
7 same category as mid-winter Arctic construction activity  
8 that has already been shown to be possible?

9 A This was our advice from  
10 our earth moving contractor, yes.

11 Q Okay. I understand you.

12 MR. STEEVES: I'd like to  
13 discuss that with you, if I could, Mr. Kosten.

14 A Yes, sir.

15 Q One of the things you've  
16 said at various regulatory bodies is that the con-  
17 struction machines involved in pipeline construction  
18 will not stand up to the temperature conditions or  
19 weather conditions to be found in the North Slope and  
20 in the delta. Is that right?

21 A I think I probably made  
22 reference to that, yes.

23 Q What do you mean reference?  
24 You've said it, haven't you?

25 A That's what I'm saying.

26 Q Well, I'll find all the  
27 references if you want.

28 A Well, if you're stating  
29 a general question, then I'm giving you a general  
30 answer.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q Okay. I'll move on now.  
2 You use caterpillar tractors?

3 A Yes, sir.

4 Q On pipelining and you use  
5 caterpillar tractors on road building, right?

6 A I'm not a road building  
7 expert. We engaged an earth moving contractor to  
8 develop this procedure for us, sir.

9 Q Have you ever seen a  
10 road built?

11 A I've seen a road built  
12 but I'm not an expert in road building.

13 Q Have you ever seen or  
14 noticed the machinery they use?

15 A Yes, sir.

16 Q Have you seen a pipeline  
17 built in your life?

18 A I've been involved in  
19 building a pipeline.

20 Q Do you use some of the  
21 same machines in building roads as you use in building  
22 a pipeline?

23 A I believe that the  
24 difference here is that the procedure that was worked  
25 out for doing all of our granular material was  
26 essentially a truck hauling operation, large off-road  
27 truck hauling units and the front end loaders and  
28 certainly dozers are involved in both operations but  
29 generally speaking, this is not equipment that is used  
30 in a normal conventional pipeline construction operation.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q What is the difference  
2 between the equipment used on road building and the  
3 equipment used in pipelining so far as the effects of  
4 low temperatures on that equipment is concerned? Is  
5 there any difference at all?

6 A Well, the road building  
7 contractor tells me that he can't do it during this  
8 period of time with the equipment that they use, that  
9 they are normally accustomed to using. They have worked  
10 on road building in the Northwest Territories and the  
11 difference is, sir, that the crews are considerably  
12 different in size. We have had experience in building  
13 pipelines in the vicinity of the southern part of the  
14 Northwest Territories and we found that we could not  
15 maintain sufficient productivity to make the operation  
16 efficient during certain portions of the winter season.

17 Q What is the difference,  
18 as far as the impact of low temperatures are concerned,  
19 on the machinery used to build roads and the machinery  
20 you use to build pipelines?

21 A I can't comment on the  
22 difference for road building because they obviously  
23 have developed procedures for this.

24 Q I'm not talking about  
25 procedures. I'm not talking about size of crews. I'm  
26 talking about the machinery and equipment. Do you  
27 understand that? I want you to tell me what the  
28 difference is?

29 A The difference is the  
30 different size of equipment.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q What is the difference  
2 so far as the impact of low temperatures is concerned?

3 A I can't answer your  
4 question, sir. I would have to refer it to a road  
5 building expert, which I am not.

6 Q Just a minute. Let's  
7 get this clear. I understand that you phoned a  
8 pipeline contractor--

9 A I did not phone.

10 Q Hold on a minute. You  
11 phoned a pipeline contractor and said what's the lowest  
12 temperature that you think a pipeline spread can  
13 operate on the North Slope. Do you remember giving  
14 that evidence?

15 A Yes, sir.

16 Q Okay. And he answered,  
17 "Oh, I'd say about thirty-five below". You constructed  
18 a whole thirty starting at that point and with that  
19 telephone conversation. Am I right?

20 A It wasn't only the one  
21 conversation.

22 Q No, but that's where  
23 it started with a phone call, right?

24 A Well, I don't think that's  
25 where it started.

26 WITNESS MIROSH: Now, we  
27 talked to people in Alyeska as well to determine what  
28 their experience was. That helped us in our judgment.  
29 I could read an article to you that appears on the  
30 Alyeska project that deals with this subject exactly.





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 THE COMMISSIONER: Well, Mr.  
2 Mirosh, I'd like to see the article but I'd like Mr.  
3 Steeves to have a run at this thing first, in his own  
4 way.

5 MR. STEEVES: What's the  
6 difference? Can's you tell me, Mr. Kosten?

7 A I'm sorry?

8 Q You can't tell me the  
9 difference?

10 A The difference--we've  
11 lost the question here.

12 Q What is the difference  
13 so far as the impact of low temperatures are concerned  
14 on machinery used in road building and machinery used  
15 in pipeline construction?

16 A Well, the question that  
17 you're asking is in an area--the road building is out  
18 of my own area of expertise. We did go to an experienced  
19 road building contractor to ensure that our methods  
20 were acceptable of getting the operation done.

21 Q And you also went to  
22 a pipeline contractor at least and asked him about  
23 pipeline construction.

24 A That is correct. When  
25 we developed our--the cost for our project, they were  
26 done in conjunction with a pipeline contractor.

27 Q Do you consider yourself  
28 as having expertise in the impact of low temperatures  
29 on the equipment used in pipeline construction?

30 A I've had the experience,



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 sir, of managing a pipeline construction division with  
2 a pipeline contractor for quite a number of years, sir,  
3 and we did do extensive winter work in pipelines.

4 Q Well, your answer then,  
5 I take it, is yes I do consider myself to have that  
6 experience?

7 A I've had the experience.  
8 Yes, sir.

9 Q And why did you consult  
10 another contractor? Just to check your own opinion?

11 A At the time that--the  
12 work that I undertook to do for Foothills, I was a  
13 consultant firm, with a consulting firm that was not  
14 in the pipeline construction business and in order to  
15 develop costs, you have to have equipment rates as  
16 a build-up to develop your construction costs and so  
17 forth and this is the reason that I went to a pipeline  
18 contractor to get the latest equipment rates and so  
19 forth.  
20  
21  
22  
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25  
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30



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q You didn't go to a  
2 pipeline contractor and say, "What's the minimum  
3 temperature you can run a strip at?"

4 A As we developed the  
5 costs, the judgment was that we would develop a  
6 reasonable schedule based on our past experience.

7 Q O.K., you did not go  
8 or phone a pipeline contractor for the purposes of  
9 asking him, "What is the minimum temperature you  
10 can operate in on the North Slope?"

11 A Not at the time that our  
12 original cost estimates were developed.

13 Q O.K., well didn't you --

14 A As I say, I worked with  
15 a pipeline contractor in developing the schedules and  
16 the costs.

17 Q Didn't it occur to you  
18 as a strange thing at some point in time when a  
19 road-building contractor says, "Sure, I can build  
20 that road in the delta in the winter," and a pipeline  
21 contractor gave you some different advice? Did n't  
22 you try and resolve that difference?

23 A The road-building  
24 contractor that we went to is experienced in doing  
25 work in the wintertime, in his road-building opera-  
26 tions.

27 Q In extremely low  
28 temperatures?

29 A Well, I would have to  
30 make that assumption, yes.





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

Q Didn't you say to yourself, "There's something wrong here. The pipeline contractor says to me, 'You can't work in those temperatures,' and the road-building contractor says, 'You can.' I want to find out why the different opinions." Did you ever go through that thought process?

A Yes sir.

Q O.K. Did you resolve it?

A As a matter of fact, the road-building contractor that I went to is the same contractor for which I used to build pipelines.

Q M-hm. Well, tell me how you resolved that apparent conflict, the advice you were getting.

A The experience that we had in both of the divisions, in both the Roadbuilding Division of the particular contractor I'm talking about, and the experience that I had in running the Pipeline Construction Division of the same company did both road-building and pipelaying operations in similar areas, and there are periods of time that we ran into problems weatherwise, and this is in Northern Alberta, the Zama Lake area. The particular contractor build the road from Hay River into Fort Simpson. Now I'm not familiar with the periods of time, but I understand that they did do some winter work.

Q One man said --

A We're talking about



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 different years.

2 Q I beg your pardon, I'm  
3 sorry, I interrupted you.

4 A We're talking not  
5 necessarily in the same years so I can't really compare  
6 conditions for you but we had a general discussion.

7 Q I want to know, please,  
8 how you resolved that conflict. One part of this  
9 firm said, "Yes, we can build roads in those  
10 temperatures." Another part said, "We can't build  
11 pipelines."

12 A No, I'm sorry, I misled  
13 you.

14 Q Oh, did you?

15 A Well, in your conclusion.

16 Q Oh, sorry.

17 A The pipeline contractor  
18 we worked with in developing the pipeline costs for  
19 this project is not the same contractor that we used  
20 for the road-building part of it.

21 Q O.K.

22 THE COMMISSIONER: But the  
23 road-building one does pipelines too.

24 A That's the one I'm  
referring to.

MR. STEEVES: Q Who is that?

25 A Loram International  
26 Limited is what they are now known as. They used to  
27 be Mannix Company Limited. The pipeline contractor  
28 that they used for the pipeline on the Foothills



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 system was Marine Pipeline.

2 Q Would you spell that  
3 first name that used to be?

4 A Loram, L-O-R-A-M  
5 International Limited.

6 Q Well, they said, "We  
7 can build roads in the winter in the North Slope."

8 A They developed these  
9 schedules here and the costs which we have included  
10 in our project.

11 Q And they said, "Don't  
12 worry about the machinery, it will run even in those  
13 temperatures."

14 A Well, they are the  
15 people --

16 Q Is that what they said?

17 A Those were the people  
18 that developed the procedures, sir.

19 Q Is that what they said  
20 to you? "Don't worry about the machinery, it will  
21 operate in the winter conditions."

22 A That essentially is  
23 the conclusion you would have to draw, yes.

24 Q And somebody else said  
25 to you, or you from your own experience, thought that  
26 that couldn't be true of pipeline equipment. Now  
27 there's a conflict.

28 A We're talking about  
29 extreme temperatures here.

30 Q Yes.









Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 a D-8 dozer.

2 Q I don't care, a D-8  
3 dozer --

4 A Let's be more specific  
5 about that. Are we talking about a D-8 dozer?

6 Q Yes, we are.

7 A O.K., then there's no  
8 difference, whether it's working on an earth-moving  
9 job or a --

10 Q There's no difference?

11 A That's correct.

12 Q Let's talk about the  
13 steels that go into roadbuilding equipment and the  
14 quality of steels that go into pipeline equipment.

15 You've had a lot to say, I think, on other occasions  
16 about the tendency of the steels that are used to  
17 fail at low temperatures, as will be experienced on  
18 the North Slope. Is there any difference in steels  
19 used in equipment in roadbuilding and equipment in  
20 pipelining?

21 A That depends on the  
22 age of the equipment also. They're building newer  
23 equipment now. They're redesigning equipment now for  
24 work in the Arctic.

25 Q Is there any difference?  
26 Is there any difference? Come on.

27 A Well, if you're talking  
28 about taking a D-8 dozer and putting it on a pipeline  
29 job and taking a D-8 dozer and putting it on a road-  
30 building job, then there would be no difference in



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1 that piece of equipment, probably.

2 Q Yes.

3 A Now, there could be age  
4 differences and so forth, but there are many more  
5 pieces of equipment that are involved here on a  
6 pipeline operation than there are on a roadbuilding  
7 operation.

8 Q Are you telling me that  
9 -- you're telling me now that the way you resolved  
10 this apparent difference of opinion --

11 A I'm answering your  
12 question, sir.

13 Q O.K. Did you do  
14 anything else to resolve this apparent difference of  
15 opinion between your roadbuilding advisor and your  
16 pipeline advisor?

17 A Well, I've had experience  
18 in building pipelines personally, sir. I have not  
19 had experience in building roads.

20 Q Well, you --

21 A I went to the road-  
22 builder to tell me how he's going to do it.

23 MR. STEEVES:

O.K. It's 12 o'clock.

24 THE COMMISSIONER: 12:15.

25 MR. STEEVES: Perhaps if it's  
26 convenient for you, sir, could we adjourn now and  
27 perhaps I could have a word with Mr. Dau and  
28 resume? I won't make any false promises like I some-  
29 times do that the adjournment will shorten the cross-  
30 examination. It may lengthen it.



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1 THE COMMISSIONER: Oh, this  
2 is important. We've got a couple of minutes, then.  
3 Let me ask a couple of questions while I think of them.

4 Q I think I see Mr. Dau  
5 here, he's giving evidence later, he may want to  
6 comment on this. I have a note, Mr. Kosten, that  
7 you said they would have to shut down at minus 35  
8 degrees Fahrenheit.

9 A Yes sir.





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Q I also have a note that Mr. Williams of Arctic Gas agreed with this. I have a note that Mr. Kosten thought 20 to 25% of the calendar days would be lost and Williams estimated about 30% would be lost. I don't have those page reference, I should have.

Let me just get at something here. Maybe Mr. Mirosh and you would reflect upon it and comment on it, and maybe Mr. Dau would later.

A I'm sure he will.

Q On this thing about wind chill, which is the report on the proposed construction of a gravel work pad. O.K., now you've got the wind chill temperatures for the coastal stations at Tuktoyaktuk, Shingle Point and Komakuk, and that takes us almost to the Alaska border, I gather; and you said the average down time for the coastal stations would be 41 days out of 89 in February, March and April. The average down time for Inuvik would be 21 days out of 89. So you figured that the wind chill factor in February, March and April would give you twice as many down time days as you would have at Inuvik, and you felt that your first 50 miles should be -- you should proceed on the assumption that you'd have the same number of down times as you would on the coast, and I take it that you're dealing with essentially tundra in both instances.

Now, how did you calculate the down time? How did you determine -- what were the criteria you used, just 35 below?



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1 A 35 below wind chill.

2 Q I see. Well, let me  
3 ask you this: Mr. Dau said that productivity on the  
4 North Slope would be 60% of productivity, say in  
5 Southern Canada. I think that's what he said.

6 Now, Mr. Williams, yes, you  
7 thought 20 to 25% of the calendar days would be lost  
8 when you were here before, and Williams thought you'd  
9 lose about 30%. Now you think that in February, March  
10 and April you will lose 46% .

11 A At that station,  
12 Tuktoyaktuk.

13 Q Right, for the first  
14 50 miles, you're proceeding on that footing.

15 A Yes.

16 Q Now, that means you  
17 can't -- why does that force you to summer construction?  
18 Why don't you just do it in two winters instead of one?

19 A That's a possibility,  
20 we might have to extend it over two or three seasons  
21 to accomplish the same.

22 Q The problem there is the  
23 fact that the borrowings to build this thing are so  
24 vast that you just can't do it that way, or the people  
25 at Morgan Stanley will not lend you the money to build  
26 this. Is that what we're talking about?

27 A The cost per season, sir,  
28 for the operation of a spread over a period of time  
29 is going to be approximately the same for each season.  
30 If you have to shorten up the sections, then there is



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1 a point in time beyond which economics of setting up  
2 a spread, gearing it up and then having to go through  
3 and apply essentially the fixed costs of it over-ride  
4 the aspect of going to another procedure.

5 Q Right, I mean I under-  
6 stand that. If you take another year before you get  
7 your cash flow through this thing, then you can't  
8 start because Wall Street won't give you the money.

9 A Well --

10 Q I mean I assume that's  
11 something that's buried --

12 A -- you'd have to really  
13 talk about that aspect to the financial people. It's  
14 a question of what -- this is not an analysis that  
15 I made that we couldn't get the money; it's a question  
16 of which is, in my opinion or in our opinion, the  
17 management of our company's opinion the better way to  
18 go here, because there is a penalty going to the gravel  
19 pad, of course.

20 Q Well, Mr. Dau said  
21 "Well, your productivity is 60%" and I don't think he  
22 wants to be wedded to that figure, but I think he was  
23 making allowances for all the problems you'd encounter  
24 on the North Slope. Well, he didn't go to summer  
25 construction, he said, "Well, we'll carry on. We'll  
26 somehow get it done."

27 WITNESS MIROSH: We are --

28 WITNESS KOSTEN: I think that  
29 you will also find that there has been evidence filed  
30 that there are such things as everything has to be



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1 sheltered and so forth, which really are not conven-  
2 tional pipeline techniques.

3 Q Everything has to be  
4 what?

5 A Sheltered.

6 Q Everything has to be  
7 what?

8 A Sheltered.

9 Q Oh, sheltered, right,  
10 sheltered.

11 A During that period.

12 Q Oh yes, I am well aware  
13 of all the points that you hurled through Mr. Gibbs  
14 at Mr. Williams, and I'm well aware of all of that.  
15 You wanted to comment , Mr. Mirosh.

16 WITNESS MIROSH: Well, I did  
17 want to tell you that extending the number of seasons  
18 of construction in the winter obviously is another  
19 way of doing it, and I think it's an important point  
20 to mention here, because Mr. Steeves is starting on  
21 the premise that it's impossible, in our opinion,  
22 to construct in this area. What we're saying is it's  
23 impossible to construct within the time and money  
24 limitations. Obviously given infinite time and money  
25 it can be done. We're saying that to try and do  
26 it reasonably, economically from an engineering point  
27 of view, with environmental considerations, the sum  
28 total of all of this leads us to believe that a gravel  
29 pad in that first 50 miles is the best way to go with  
30 summer of fall construction.





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I did want to add one other point. There has been quite a bit written about Alyeska and a lot of people have been there, but there's been a lot of confusion about whether Alyeska works in the wintertime. Some of the most recent articles -- and I don't want to read an article, just a paragraph here.

On the spread which is Arctic constructed, and they're the ones that are working out of Prudhoe Bay south, this one paragraph in the August, 1976 "Pipeline Industry" magazine it says:

"Due to severe weather conditions and resultant low productivity, all construction operations were shut down in early December of '75. Remobilization was started in February '76. However, due to weather conditions and shortage of craft personnel, pipelaying did not resume until the week of March 14, '76."

Now this is but one reference in this particular issue. There are many others to weather problems, mechanical problems, all related not only with wind chill but with cold temperatures. This sort of thing that Mr. Steeves was talking about, and we agree, we talked to equipment manufactures, people are putting in better metallurgy and so on, but obviously Alyeska is the state of the art, and a lot of equipment breakdowns have occurred there and they've had manpower problems and temperature has played a role.

We've looked at this and



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1 we think that we're taking a rational approach.

2 MR. STEEVES: Q Wasn't  
3 Alyeska planning summer construction?

4 A Well, it was; but with  
5 the problems of running into all sorts of time delays,  
6 they tried to extend their work into the winter but  
7 they found they were unsuccessful.

8 THE COMMISSIONER: Alyeska  
9 has a gravel pad.

10 A Yes, they do.

11 Q They call it a haul  
12 road.

13 A A haul road, yes.  
14 Well, they have both, a haul road and a gravel pad.

15 Q Maybe you'd leave that  
16 with Miss Hutchinson. It could be an exhibit -- the  
17 article, I mean.

18 A Yes.

19 Q Maybe she could photo-  
20 stat it, if it isn't too long, and we could have it  
21 before us this afternoon when we're resuming this  
22 conversation.

23 A Fine.

24 Q Just before you stop  
25 here, let me just look at my notes. It's hard  
26 to cast one's mind back to what occurred many months  
27 ago, but Mr. Williams, I think, was talking about down  
28 time over a whole winter season. You're starting with  
29 the assumption you have a very limited season, beginning  
30 February 1 on the North Slope on your first 50 miles,



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1 and then you're really saying you'd only have 50%  
2 of that season in winter, so Mr. Williams, even though  
3 he appeared to agree with your first set of figures,  
4 he was talking about the whole winter season so he was  
5 far more optimistic than you. Am I making sense?  
6 Do you remember these figures?





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1 WITNESS KOSTEN: I believe  
2 so. This is the starting December 1st date and this  
3 is the period we're talking about. There's some 136  
4 days. Is this what we're speaking of?

5 Q Yes.

6 A To the middle of April  
7 or somewhere in there.

8 Q But am I right about  
9 Mr. Williams? He said he'd lose thirty percent of those  
10 days throughout the whole winter. December 1 or  
11 whatever it was. You see, he started his construction  
12 season back by October 1 by the time he was through  
13 with it and I think--November 1. Originally he said  
14 he'd start December 1 but then he became more optimistic  
15 about establishing snow roads and he brought us back  
16 to November 1st on the North Slope?

17 A I haven't sat in on all  
18 of the hearings on this. Possibly Mr. Mirosh might  
19 want to comment on that.

20 WITNESS MIROSH: Yes, I believe  
21 that the latest evidence shows that Arctic Gas feels  
22 that they can actually get out some time in October  
23 and they make, as a result of this, statements that the  
24 time of construction available is from October through  
25 to closure, which is about April or May.

26 We had quite a disagreement  
27 when we were here before with Mr. Jarvis who was talking  
28 about when he thought the sufficient degree days had  
29 accumulated so that we could begin building snow roads.  
30 This, still is a large point of difference in that Arctic



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1 Gas, I believe, does maintain that they can start on  
2 October 1st and somehow conclude that pipe laying  
3 begins at that point. In our opinion, snow roads on  
4 the coast can probably begin being prepared about the  
5 middle of October but it takes about a month for  
6 construction and another month to haul materials and  
7 build camps and then you're into Christmas and you  
8 really have done no pipe laying work. This is where  
9 we tend to disagree.

10 Q Well, you have two  
11 disagreements about the North Slope. One is, and I  
12 recall Mr. Jarvis' evidence and his dispute with Mr.  
13 Williams; that is about when you've got enough snow,  
14 when you can harvest enough snow when the weather  
15 gets cold enough to have your snow roads in place and  
16 he was more optimistic than you about that. But even  
17 if you assume he got this whole thing in place, what  
18 you're arguing with Mr. Steeves about now is whether  
19 the equipment, the men, the requirements, the shelter,  
20 the size of the spread and so on and so forth, make  
21 it possible to carry on anyway. That's the thing  
22 you're really fighting about right at the moment, isn't  
23 it?

24 A That's correct, but it's  
25 important to bear in mind this length of season because  
26 part of the arguments that I think you'll hear later  
27 today is that there is a very long season available  
28 with lots of spare days for Arctic Gas construction and  
29 in our opinion, these very days are all used up in  
30 building snow roads, and getting the degree days



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1 accumulated for the activities that are actually pre-  
2 cursor activities to pipeline.

3 Q Right. Right. Sorry I'm  
4 not as acute in dealing with this subject as I ought  
5 to be.

6 MR. STEEVES: Could I clarify  
7 a point sir. Did I understand you to say that you have  
8 a disagreement with Mr. Jarvis in the evidence he gave  
9 about this?

10 A No, not with Mr. Jarvis.  
11 We agree with Mr. Jarvis' evidence. There was a slight  
12 modification that had to be made to the graph but it  
13 doesn't affect any of the times we talked about. Mr.  
14 Jarvis disagrees with Mr. Williams.

15 Q I'm sorry. I thought  
16 I heard you say--

17 THE COMMISSIONER: That's  
18 what you said.

19 MR. STEEVES: --that we disagree  
20 with Jarvis.

21 A Oh, I'm sorry.

22 Q Now, if you want to  
23 withdraw that--

24 A I withdraw that if I  
25 said that.

26 THE COMMISSIONER: Okay, so  
27 let's come back at 2:00 and we'll carry on this  
28 evening shall we, if that should be necessary.

29 (PROCEEDINGS ADJOURNED TO 2 P.M.)  
30





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1 (PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

2 (ARTICLE: PIPELINE INDUSTRY MAGAZINE, AUGUST  
3 1976, "ARCTIC CONSTRUCTORS ... 209 MILES,  
4 PRUDHOE BAY SOUTHWARD OVER THE RUGGED BROOKS  
5 RANGE", MARKED AS EXHIBIT #845)

6 MR. GOUDGE: I think if you're  
7 ready sir, we're prepared to resume.

8 THE COMMISSIONER: All right,  
9 we'll call the hearing to order. I think that before  
10 we begin since we have some students in the class,  
11 I'll explain what we're doing here today. I don't know  
12 what you're doing here today, but I'll explain what  
13 we're doing.

14 These gentlemen who sit at  
15 these tables in front are lawyers and they represent  
16 the companies and the other organizations at this  
17 hearing and this gentleman over here, in the dark suit  
18 in front is Mr. Hollingworth who represents Foothills  
19 Pipelines, one of the pipeline companies. The three  
20 gentlemen who sit at the table behind him are Mr. Steeves,  
21 Mr. Marshall and Mr. Ziskrout, who represent Arctic  
22 Gas, that's another pipeline company and I don't quite  
23 understand why they've got three lawyers and Foothills  
24 has got only one, but --. And this gentleman over here  
25 is Mr. Veale who represents the Council of Yukon Indians  
26 and this gentleman in the checked suit here is Mr. Goudge  
27 who is Commission Counsel. He's my lawyer. And the  
28 gentlemen at that far table are Mr. Okpik and Mr. Fraser  
29 and Mr. Sittichinli of the C.B.C. and the two young  
30 ladies with the masks here just below me, take down on





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1 tape, everything that's said here, so that we won't  
2 forget it and the lady in the blue suit over there,  
3 is Miss Hutchinson, the secretary of the Inquiry, and  
4 these three gentlemen here, Mr. Byers and Mr. Mirosh  
5 and Mr. Kosten, they are experts who are here to speak  
6 for Foothills and they're trying to persuade me that  
7 it's too cold up by the Arctic Ocean to build a pipe-  
8 line in the winter time so you've got to build it in  
9 the summer time. They say it gets too dark and too  
10 cold up there and you can't build it in the winter time  
11 you've got to build it in the summer time.

12 Now after they've given evidence,  
13 I expect we'll hear from experts for Arctic Gas who  
14 will tell me that these gentlemen are wrong, that you  
15 can build a pipeline in the winter and you don't have  
16 to build it in the summer. And the reason why that's  
17 important is, that the environmental experts tell us  
18 that in the summer up in the Arctic Coast, there's a  
19 lot of Caribou around, a lot of birds and that if you  
20 had all these people building pipelines in the summer,  
21 they might drive the Caribou and the birds away and  
22 they might not produce any young and that would diminish  
23 the populations of those species. So that's why it's  
24 important why we figure out, whether we should build  
25 this thing in the winter or the summer. So having told  
26 you about that, and having demonstrated that I under-  
27 stand what was said this morning, I think we can proceed.

28 MR. GOUDGE: Mr. Steeves is  
29 prepared to resume his cross-examination sir.

30 MR. STEEVES: Mr. Mirosh I'd



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1 like to speak with you for a moment if I might, about  
2 the Article that you've produced just before the luncheon  
3 adjournment.

4 This Article appears to touch  
5 on one of the important differences between your under-  
6 standing of the construction problem on the north slope  
7 and in the Delta and that of Arctic Gas. Do you agree?

8 WITNESS MIROSH: It deals  
9 with some of the concerns that we have, yes.

10 Q Have you done any in-  
11 vestigation, have you talked to anybody, at Arctic  
12 Constructors since this Article appeared?

13 A No, not since, but we  
14 have had people in contact with I believe, all of the  
15 contractors prior to.

16 Q Well have any of these  
17 people that you've had in contact with, Alyeska con-  
18 tractors, spoken to Arctic constructors, since this  
19 Article?

20 A Not since the Article,  
21 no.

22 Q Well, do you know sir,  
23 that the remainder of the work to be done on the Arctic  
24 Constructions Project has been scheduled for this  
25 coming January?

26 A No, I imagine it was  
27 scheduled earlier for January, and they decided that  
28 they'd have to shut down due to weather as the Article  
29 said.

30 Q Do you know that the



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1 remainder of the work to be done under this contract  
2 is now scheduled to be completed starting next January?

3 A I do not know that, no.

4 Q You know that the Article  
5 is inaccurate where it states, the date when startup --  
6 the date of startup after the Christmas shut down, and  
7 that in fact the work was started in February and not  
8 in March?

9 A I'm not aware of any in-  
10 accuracies in the Article.

11 Q Do you know that the  
12 reason for the shut down at Christmas was that the  
13 Tulsa Local Welders went home?

14 A No I think the Article  
15 said, there was manpower problems at that time.





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Q Well, in other words, you read the article and took it at face value, is that it?

A Oh, the article is one item that supported our case and I put it before the Inquiry as that, yes.

Q Because it supported your case, you took it at face value. Is that what you're saying?

A I have not checked all of the detail or any of it in the article, but it does not disagree with information that we have heard and observed.

Q I'm sorry. I didn't understand it. You have not checked all of the details or you have not checked any? Which is it?

A No, I have not checked any. I have not gone out and checked the article for accuracy.

Q I'd like to return, Mr. Kosten, if I could to you and ask you this; have you told me and the Inquiry everything you want to say about the differences between road building equipment and pipeline building equipment so far as its vulnerability to low temperatures is concerned?

WITNESS KOSTEN: Well, I think that one of the things that has not been brought out is that you dealt primarily with the extreme temperatures, if you want, and their effect on the equipment. There is attached to the equipment, of course,



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1 a crew of people that have to work under these  
2 conditions and one of the things that that there is a  
3 difference is that the size of the crews of the normal  
4 road building operations that I'm vaguely familiar  
5 with are substantially less than what is required or  
6 going to be required for the building of say in one  
7 spread of the pipeline crew.

8 I don't think that you can  
9 draw a comparison in that direct sense because you're  
10 talking about a crew of about five hundred people and  
11 you're talking substantially less on the road building  
12 crew and it's a combination of effects here, in my  
13 opinion, that there is a difference that work in fact  
14 is carried on on a road building operation in the  
15 wintertime.

16 To try and draw any comparison  
17 between a road building operation and the pipeline  
18 operation is no more valid than comparing a road  
19 building operation or a pipeline building operation  
20 to say a dam construction job. Your equipment is  
21 different, your procedures are different and there is  
22 a distinct difference in the approach to the--you have,  
23 for instance, your heavy equipment on your road  
24 building operation is, as I understand, large off  
25 highway trucks and these trucks, of course, the people  
26 that operate them are inside. They are not exposed  
27 to the elements and these are the sort of things that  
28 we're talking about, I believe.

29 Q Would you please attend  
30 to my question. Have you told the Inquiry everything



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1 you wanted to say about the differences, if any,  
2 between equipment? We'll turn to manpower in a moment.  
3 Do you understand the question?

4 A I understood you that you  
5 asked me if there was anything else that I wanted to  
6 tell you about the difference.

7 Q About the difference  
8 between equipment used on road building and equipment  
9 used on pipelines. Do you understand the question?

10 A All right.

11 Q You do?

12 A I believe I do now, yes.

13 Q Okay. Would you answer  
14 then?

15 A I did not hear you ask  
16 about specifically about equipment. I can't say that  
17 I'm familiar personally to the degree as far as my  
18 expertise is concerned, as far as the road building  
19 operation is concerned and I'm prepared if an earth  
20 moving contractor tells me that he can do his work  
21 within the periods that he has scheduled, I'm prepared  
22 to accept that.

23 Q Okay. Now, let's turn  
24 to the topic you wanted to discuss, I think, and that's  
25 manpower and the effect of low temperatures on the  
26 men that are operating the equipment and doing the  
27 work.

28 A Operating the equipment  
29 and all the other people that are not housed in tractor  
30 cabs and truck cabs and so forth.









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1 Q The difference is as I  
2 understand you to tell me it between a road building  
3 job and a pipeline job is the size of the crew. Is  
4 that right?

5 A That's one of the  
6 differences. There are differences in types of  
7 equipment as well.

8 Q Well, let's take them  
9 one by one. Let's take that one. How does extremely  
10 cold temperatures affect--how are the effects of  
11 effects of extremely cold temperatures modified or  
12 altered by the size of the crew that's involved? You've  
13 lost me. I don't understand what you're telling me.  
14 Let's assume that the road building crew is twenty  
15 men and let's assume that the pipeline crew is eight  
16 hundred men. How are the twenty men affected  
17 differently by low temperatures than the eight hundred?

18 A There is an operation,  
19 for instance, in Richards Island that moves rigs  
20 and so forth and they consist of a crew of about seventy-  
21 five people. These people have been working in the  
22 area for about the last four years. They are experienced.  
23 They are familiar with the conditions. You don't have  
24 five hundred people or more for each pipeline spread  
25 that are available, that are experienced and working  
26 in the Arctic.

27 You have to take these people  
28 and bring them in and expose them to these conditions.  
29 It's a completely different situation, in my opinion.

30 Q Insofar as the manpower--



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1 insofar as the work force is concerned on a road  
2 building job, you understand them to be experienced in  
3 harsh, northern climatic conditions and therefore,  
4 able to work productively in those conditions because  
5 of that experience? Is that what you're saying?

6 A That's one of the factors.

7 Q Okay. Now, as to  
8 pipeline crews, you anticipate that these men will be  
9 brought in from the south and that many of them will  
10 not have experience with harsh, northern climatic  
11 conditions in the winter?

12 A There will be some that  
13 will not have had that experience.

14 Q How will that lack of  
15 experience result in a lessened productivity? I want  
16 you to explain that to me.

17 A I think that you're  
18 going to have in addition to this people that will not  
19 have had previous pipeline experience involved in this  
20 project because of the manpower that is projected to  
21 be required and this is another factor, coupled with  
22 the fact that they will not be accustomed to working  
23 under the conditions we have--these sort of factors,  
24 I think, will affect the productivity that anyone would  
25 otherwise expect to obtain on a smaller project.

26 Q You're just guessing,  
27 aren't you?

28 A No, I'm not.

29 Q How do you know it will  
30 affect the productivity?



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1 A I've been faced with  
2 problems of this nature.

3 Q You were on a job in  
4 northern Alberta. Is that the job you're talking  
5 about?

6 A Yes, sir.

7 Q And that's the experience  
8 you're talking about?

9 A Well, winter experience.

10 Q Well, let's talk about  
11 that job. That job didn't work out well, did it?

12 A Yes, it did.

13 Q Oh, did it?

14 A Yes.

15 Q Was it a winter  
16 construction job?

17 A It was a winter  
18 construction job.

19 Q And it worked out well?

20 A Yes, sir.

21 Q I don't understand you.  
22 Is there not some contradiction there?

23 A No, there isn't.

24 Q Well, let me make sure  
25 I understand. You had the supervision of a pipeline  
26 construction job in northern Alberta--

27 A Yes, sir.

28 Q --under harsh climatic  
29 conditions?

30 A Yes, sir.

Q The job worked out well?





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 A We completed the job  
2 on schedule.

3 Q You got the productivity  
4 you anticipated you would get?

5 A Not on the ditching.  
6 There were operations that we had problems with.

7 Q In general, the result  
8 of the project of construction during winter was  
9 satisfactory.

10 A It was about what we  
11 had anticipated. We had had some previous experience.

12 Q Was it satisfactory?

13 A It was.

14 Q O.K. So that whatever  
15 problems arose when you were running this job in  
16 Northern Alberta, associated with harsh climatic  
17 conditions you were able to resolve.

18 A This was after about  
19 the fifth year of the first pipeline construction  
20 experience that we had.

21 Q O.K., but you were  
22 able to resolve it, is that what you're saying?

23 A Well, we got the job  
24 done.

25 Q O.K. Now, did you  
26 achieve something that others aren't capable of  
27 achieving on that job? I'm not following you.

28 A No, there were other  
29 jobs going on concurrently.

30 Q And did they get the



1 same satisfactory results in the harsh climatic  
2 conditions as you did?

3 A The harsh climatic  
4 conditions that you speak of during -- on the project  
5 that we're referring to here, during the period that  
6 we ran into the harsh climatic conditions we shut the  
7 job down, because we were not getting the productivity.  
8 This is a direct result of if you don't anticipate  
9 that you are going to have this sort of a problem,  
10 to shut a pipeline job down during a period once it  
11 started up is very costly and it did result for us  
12 in some unproductive days, something we kicked the  
13 job off in early January and during that period between  
14 the kickoff and late January we had to shut the job  
15 down because of severe weather conditions.

16 Other contractors have been  
17 faced with the same problems, and when they tried to  
18 kick a job off in the early part of the year many  
19 contractors have had the problem of having to shut  
20 the job down after they started, and this becomes very  
21 costly.

22 Q Was it in fact very  
23 costly on the job you're talking about?

24 A Yes, on the job that  
25 I'm talking about, of the order of \$75,000 a day, which  
26 is a much smaller crew.

27 Q Tell me what that is  
28 in terms of a percentage of the estimated cost. How  
29 big was the job? What was the contract like?

30 A I don't know whether I



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 can disclose that figure. That's confidential informa-  
2 tion that the contractor has. I believe it would  
3 be privileged information and I'd have to go back to  
4 the contractor to see if that number could be disclosed.

5 Q Well, you didn't build  
6 this pipeline. Some contractor did. Is that what  
7 you're saying?

8 A I was the division  
9 manager.

10 Q You were representing  
11 the owner.

12 A No, I was not represent-  
13 ing the owner.

14 Q Who were you representing?

15 A I was working for the  
16 Contractor.

17 Q You were employed by  
18 the contractor.

19 A I was employed by the  
20 contractor. I was --

21 Q Did the contractor make  
22 or lose money on the job?

23 A Well, I guess I'd have  
24 to answer you, we broke even.

25 Q Are there any -- we've  
26 talked -- I'm sorry, have you exhausted what you have  
27 to tell us about the impact of low temperatures on  
28 the labor force, or have you got anything else to say?

29 A I believe that --

30 Q That's everything, is it?



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 A Unless Mr. Mirosh wants  
2 to comment more, he may.

3 Q Well, I'll turn to Mr.  
4 Mirosh when I'm done with you if I may.

5 A Fine.

6 Q Is there any other factor  
7 which affects or is affected by low temperatures in  
8 pipeline construction? We've got equipment, we've  
9 got manpower. Is there anything else?

10 A Well, there is a financial  
11 factor involved in it, of course, as the result of  
12 that, which is quite important when assessing any  
13 project, whether you're bidding a large job or a  
14 small job.

15 Q Were you responsible for  
16 the recommendation to Foothills that in the area  
17 encompassed by this 50-mile amendment you couldn't  
18 get the job done in the winter, and that it was better  
19 to move to the summer?

20 A I was one of the people  
21 who --

22 Q Who else was there?

23 A I discussed it with  
24 a contractor consultant.

25 Q Who was that?

26 A Marine.

27 Q Who?

28 A Marine Pipeline.

29 Q I see. Who at Marine?

30 A Mr. Sharman.





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q Are they going to give  
2 evidence here?

3 A No sir.

4 Q They're not?

5 A No sir.

6 Q Well, I want to know, is  
7 it your opinion we're hearing or Marine Pipeline's  
8 opinion?

9 A Well, I guess it was  
10 my recommendation to our management as a result of  
11 discussions that I had with Marine, and I fed my  
12 recommendations into Mr. Mirosh, and then it was put  
13 to our management.

14 THE COMMISSIONER: Could you  
15 tell me what position Mr. Sharman has at Marine  
16 Pipeline?

17 A I believe he is currently  
18 executive vice-president and general manager.

19 MR. STEEVES: O.K.

20 Q Exactly what did you  
21 ask him? This is the famous phone call, isn't it?

22 A No sir.

23 Q Oh, this is another  
24 occasion.

25 A Yes sir.

26 Q What did you ask him?

27 A I asked him what his  
28 reaction would be to putting a pipeline through and  
29 to work under the conditions that we're referring to  
30 here.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q Well --

2 A Taking into account the  
3 weather.

4 Q -- just tell me it all,  
5 will you, what conditions?

6 A The combination of  
7 temperature and wind, and the effect that that has  
8 on the combined wind chill, and what productivity  
9 can be achieved under those conditions.

10 Q Well, did you show  
11 him a piece of paper, or did you tell him what the  
12 conditions were going to be?

13 A I believe I showed  
14 him our temperature records, yes.

15 Q Will you produce the  
16 piece of paper that you showed him, please?

17 A That's already been  
18 filed.

19 Q Well, will you still  
20 produce it?

21 A Yes.

22 Q Could you produce it  
23 now?

24 A I don't have it with  
25 me, no.

26 Q Oh, has it been filed  
27 as an exhibit?

28 A It has been filed  
29 at the National Energy Board, the temperature records  
30 that we're talking about. These are the records for



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Tuktoyaktuk and Inuvik.

2 THE COMMISSIONER: Oh, these  
3 are the records that are summarized in this document,  
4 "Report on the proposed construction of  
5 a gravel work pad,"  
6 on the first page under the introduction, so that we  
7 all know what we're talking about.

8 MR. STEEVES: I'm sorry,  
9 maybe I can just give you this.

10 THE COMMISSIONER: Those  
11 were filed here, I think. Is that an exhibit in these  
12 proceedings?

13 MR. STEEVES: I don't think  
14 so, sir. Could you tell me, sir?

15 A The answer to your  
16 question would be I can't recall at this point  
17 whether I specifically showed them those particular  
18 documents, but it was the conditions in summary that  
19 were discussed with him.

20 Q The what?

21 A The conditions in  
22 summary form.

23 Q Well, tell me about the  
24 summary form, please.

25 A These would be verbal.

26 Q Well, what did you say?

27 A I told him what the  
28 wind chill factors that would be encountered along  
29 the Arctic coast, what we anticipated they would be,  
30 and what sort of approach should be taken to achieve





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 the pipeline construction.

2 Q I don't want you to  
3 repeat it word for word. I'm not suggesting you should  
4 or could do that. But I would like you, if you can, to  
5 cast your mind back to that interview and try and  
6 tell me, where was it, in your office or in Marine  
7 Pipeline's office? Or was it somewhere else altoge-  
8 ther?

9 A I believe it was in  
10 Marine Pipeline's office, from what I can recall. It  
11 was in Calgary.

12 Q O.K., and who was there,  
13 just you and Mr. Sharman?

14 A Myself and Mr. Sharman  
15 and I believe one of the people that works for him  
16 was in the meeting.

17 Q Was this an informal  
18 meeting, or was it a meeting that you had arranged?

19 A Yes. It was a meeting  
20 that I had arranged to discuss with him specifically  
21 what we had encountered and what they thought about  
22 it.

23 Q O.K., now I'd like you  
24 to try and concentrate and put your mind back and  
25 try and tell me, repeat the essence of what you said  
26 to Mr. Sharman.

27 A The essence was that  
28 we are into a condition here where we feel that the  
29 wind chill temperatures are going to negate productivity  
30 and in essence the situation centred around the fact



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 that when we got into extreme temperatures, that is  
2 wind chill -- and I've stated these figures of beyond  
3 minus 35 degrees -- as to what effect this would have  
4 on the productivity; and from what I can recall, the  
5 recommendation was, "Well, don't work during that  
6 period."

7 Q Is that really what  
8 you said to Mr. Sharman?

9 A That's -- you asked me  
10 to try and recall it -- that's --

11 Q That's your best  
12 recollection?

13 A -- editorializing, if  
14 you want, the conversation --

15 Q Oh, I understand that.

16 A -- and the gravel pad  
17 concept was discussed with them.

18 Q What I take out of  
19 that was you said to him, "We're going to have  
20 conditions of wind chill where productivity is going  
21 to be radically affected. Do you think we should work  
22 in those circumstances?"

23 And he said, "No, I don't  
24 think so."

25 Is that what it was?

26 A You're rearranging the  
27 words here to give it a different context, I believe.  
28 But I'm trying to give you a summarization of what I  
29 can recall of the discussion.

30 Q Well, that's the sense



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 I take from what you told me of your conversation  
2 with Mr. Sharman. If that's unfair or inaccurate I  
3 want you to say so.

4 A It was discussed that  
5 we had tried working under those kind of conditions  
6 but we had had problems -- Marine had had problems  
7 on jobs that they had done in Northern Alberta even,  
8 and that they had actually had to shut down similar  
9 to what our experience had been on jobs that we had  
10 worked on in Alberta.

11 Q Will you tell me, please,  
12 the numbers involved and the kinds of conditions you  
13 discussed with Mr. Sharman at Marine Pipeline office  
14 in Calgary that day?

15 A I don't --

16 Q Can you give me those  
17 numbers?

18 A What numbers are those?

19 Q Temperatures. Wind  
20 velocities.

21 A No, I --

22 Q Comfort range, can you  
23 give me any numbers?

24 A Minus 35 degrees is what  
25 we discussed as being the approximate range at which  
26 work should be shut down.

27 Q O.K., and did you tell  
28 Mr. Sharman how that 35 degree -- minus 35 degree  
29 figure was going to fit into your construction  
30 schedule up in the delta?



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 A I don't understand your  
2 question.

3 Q I don't understand what  
4 you told me. I still don't understand. Did you say to  
5 Mr. Sharman "Do you think that you can work with  
6 reasonable productivity at minus 35 degrees or less?"  
7 Is that what you asked him?

8 A Well, no. The discus-  
9 sion centred around whether we can get any productivity  
10 under those conditions. Now, in setting our schedule  
11 -- previous schedules for work on the project, these  
12 sort of discussions had, as to when you should start  
13 work, taking into account. For instance, we had  
14 previously not intended to start work in the north  
15 end of our spread until about the end of January or  
16 towards February because of the fact that you would  
17 expect to have the extreme conditions during that  
18 period as well as the lack of daylight. Now, the  
19 records that we have here indicate that those same  
20 conditions are likely to extend in that area into  
21 February and March as well, and that these are --

22 Q So you really can't  
23 start work until April, is that what you're --

24 A About the middle of  
25 March.

26 Q Oh, I see.

27 A Now, you have a month  
28 and a half in which you can expect to get reasonable  
29 productivity.

30 Q O.K. I'd like you to





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 identify those figures for me with reasonable  
2 particularity. Can I give you anything that will allow  
3 you to do that for me?

4 A To identify which?

5 Q The figures which you  
6 say established these intolerable working conditions.  
7 Those figures.

8 A If you take your combined  
9 wind chill -- I'm sorry, your combined wind and  
10 temperature, which establishes your wind chill, and  
11 assume that you are going to shut down when you  
12 reach a wind chill factor of 35, whether it's 35  
13 degrees below zero at zero wind, or any combination  
14 of temperatures that produce a minus 35 wind chill  
15 temperature, and assume that you are not going to  
16 get sufficient productivity to continue operating  
17 your spread during that day.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q Have you done a reason  
2 full analysis of the weather conditions and in particular,  
3 temperatures to be expected and wind velocities to be  
4 expected in the 50 mile area?

5 A We did it for two points  
6 for which records were available from Environment  
7 Canada and that was Tuktoyaktuk and Inuvik.

8 Q And is that the material --

9 A That's basically --

10 Q -- that's the data that  
11 you used?

12 A That's correct. Well it's  
13 a result of the basic data out of a computer printout.

14 Q And perhaps that should  
15 be marked sir. I understand that it hasn't been filed  
16 here.

17 THE COMMISSIONER: Yes, please  
18 do.

19 (TEMPERATURE CHARTS, INUVIK 1970 - 1974,  
20 TUKTOYAKTUK 1970 - 1974 MARKED AS EXHIBIT #846)  
21 (CHART; COOLING POWER OF WIND EXPRESSED AS  
22 "EQUIVALENT CHILL TEMPERATURE" MARKED AS  
23 EXHIBIT # 847)

24 MR. STEEVES:

25 And would you agree with  
26 me that this is a recording of the information shown  
27 from Environment Canada records?

28 A That is correct.

29 Q Somebody went and took  
30 notes and put them on here?

31 A No, that is correct, yes



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 sir.

2 Q And does it represent --

3 A The wind chill, I should  
4 point out, that the wind chill was derived, that we  
5 obtained wind velocities and temperatures and wind  
6 chills was derived from those velocities and tempera-  
7 tures.

8 Q And where did you get  
9 that from? Did you get that from a document that's  
10 marked NPO-529 in the National Energy Board? Sorry,  
11 PE.

12 A Yes. This is a copy  
13 of a wind chill chart that is in a document.

14 Q And the conclusions that  
15 you reached about this wind chill factor, incorporated  
16 in the calculations which you made and which are set  
17 out on page 1 of the document entitled the Report on  
18 the Proposed Construction of a Gravel Work Pad, where  
19 you have in the middle of the page, average downtime  
20 for coastal stations, and average downtime  
21 for Inuvik.

22 A Yes, I believe that should  
23 say Coastal Station which would be Inuvik. I'm sorry,  
24 Tuktoyaktuk.

25 Q Yes. Could you explain  
26 to me how you reached those conclusions, that is 20  
27 days out of 28 in February downtime, 19 days out of  
28 31 in March, downtime.

29 A Those were the --

30 Q Just go slow will you





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 please?

2 A -- summarization of the  
3 five year records and averaged for the months of Feb-  
4 ruary, March and April and at which the wind chill  
5 temperature went beyond minus 35 degrees or lower.

6 Q Okay. Now where did you  
7 get the minus 35 figure from? Is that from your own  
8 experience or what somebody else told you?

9 A Well, since this was --  
10 has been our own experience, it's also been the ex-  
11 perience of other contractors.

12 Q I'm sorry, do you mean --  
13 do you mean the royal "we" or are you speaking about  
14 Foothills generally?

15 A I'm not sure what you  
16 mean by the royal "we".

17 Q Well what do you mean,  
18 our, who's our? Is it Foothills?

19 A Foothills, yes.

20 Q I want to know what you  
21 knew about it. What you did about it.

22 A What I did about it?

23 Q Yes.

24 A I'm not sure I understand  
25 your question.

26 Q Well, I want to know why  
27 you, was it you, that consulted another contractor?

28 A Yes sir.

29 Q What was the purpose in  
30 your consulting a pipeline contractor?



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 A To confirm that we were  
2 talking in similar terms about our past experience.

3 Q I see. So what you said  
4 to him, was I am of this opinion, do you agree? Does  
5 that essentially outline?

6 A Yes sir.

7 Q What did you say your  
8 opinion was?

9 A That I didn't think that  
10 we could get any production beyond that point.

11 Q Below 35 -- minus 35  
12 degrees?

13 A That's correct.

14 Q And Mr. Sharman said, I  
15 agree? Is that the substance of it?

16 A That's the substance of  
17 it, yes.

18 Q Okay.

19 A I also talked with other  
20 contractors.

21 Q All right, who did you  
22 talk to? Let's get their names.

23 A Such as the Loran Organi-  
24 zation, who were at that time doing work for us.

25 Q Who did you talk to there?

26 A John Jameson.

27 Q What did he tell you?

28 A Well in essence the same  
29 thing that we would not get any extensive productivity  
30 sufficient to sustain -- keeping the operations going.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q These are the people that  
2 are going to build a winter road in -- build a gravel  
3 road in the winter?

4 A That is correct sir.

5 Q Is that right?

6 A That is correct sir.

7 Q Did you ask him, how come?

8 A No, I didn't ask Mr.

9 Jameson, he's the manager of the pipeline division.

10 Q And the pipeline division  
11 doesn't talk to the road building division, is that  
12 what you're saying?

13 A I assume they do. I  
14 didn't ask him whether he talked to the road building  
15 division.

16 Q Okay. Who else did you  
17 talk to?

18 A Well I would have talked  
19 to the Majestic Wiley people.

20 Q Hm, mm. What did they  
21 say?

22 A They agreed with our --  
23 with our analysis of it.

24 Q Well did you lay your  
25 whole analysis before the Majestic?

26 A Well they were talking  
27 about temperatures here now.

28 Q Okay. This is the tele-  
29 phone conversation isn't it, with Majestic?

30 A This is one of the tele-



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 phone conversations we also -- I talked to Mr. McCarthy  
2 of that organization.

3 Q When you talked to  
4 Majestic, did you know that they were doing work in  
5 Alaska?

6 A Yes sir.

7 Q Did you ask them about  
8 their experience in Alaska?

9 A I didn't ask them about  
10 their experience in Alaska.

11 Q Now I want you to think  
12 carefully. Did you -- are you sure about that?

13 A Well -- we discussed it  
14 in general terms, if you wish.

15 Q Well that's not what I  
16 wish, I want you to remember what you discussed with  
17 Majestic, if you can.

18 A Well I can't give it to  
19 you word for word sir.

20 Q I understand that, I'm  
21 not asking you to. Did you say to the man at the  
22 Majestic, hey, you've been doing the work in Alaska,  
23 in the north slope, tell me about that. Did you say  
24 that to them?

25 A We were up and actually  
26 visited their construction operation at Delta camp --  
27 this was during the summer though.

28 Q I'm sorry, what does that  
29 mean? No, you didn't ask him that question?

30 A What question are we





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 referring to sir, now?

2 Q Did you ask the man at  
3 Majestic when you phoned him, to tell you about Majestic's  
4 experience in pipeline construction on the north slope  
5 in Alaska?

6 A The particular phone call  
7 that we're referring to here, if that's what we are  
8 referring to, no I did not ask him what their experience  
9 in Alaska was at that time. We'd been up to see their  
10 job.

11 Q I'd like to turn to you  
12 for just a moment if I could please Mr. Byers, and I  
13 gathered from my discussion with you this morning,  
14 about the environmental impact of summer construction  
15 of a leg from the Delta over to Prudhoe Bay along the  
16 coastal route, but you wanted to think about that for  
17 a little while before you answered it. Did I sense  
18 your position correctly?  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 WITNESS BYERS: No, sir. I  
2 was of the opinion that I had responded that first of  
3 all on even a short notice this afternoon as compared  
4 to this morning. It would be hard for me to respond  
5 to your question. I could agree with your principle  
6 of potential for if you/<sup>go to</sup>gravel pad, as I understand  
7 it, on Richards Island. Then if there's a potential for  
8 the same thing across the North Slope, I could under-  
9 stand that. But I also stated that I think in an  
10 environmental perspective, I couldn't give you an  
11 answer based on what we've done to date on that area.

12 Q I'm sorry. I don't want  
13 you to--I'm not pretending or suggesting to you that  
14 you've done a lot of research or examination, but you're  
15 familiar with the general environmental state of the  
16 coastal route, are you not?

17 A Yes sir, I am.

18 Q You've done some study  
19 of it because it's part of the Arctic Gas construction,  
20 isn't it?

21 A Well, I wouldn't say  
22 study. I've reviewed the material.

23 Q Okay. What would your  
24 position be if Foothills at one of your meetings, an execu-  
25 tive told you that they were planning to construct a  
26 four hundred mile lay from the delta to Prudhoe Bay  
27 along the coastal route in the summer? What advice  
28 would you give them?

29 A I would be in direct  
30 opposition to it. If an executive of Foothills said



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 we are in a position that we are going to do that, you  
2 must understand that's a sure supposition on this  
3 part right now.

4 Q Well, supposing they told  
5 you this, we don't know how to do it in the winter;  
6 so, the only time we can build it is in the summer, and  
7 that's the reason we are going to go ahead and do it.  
8 What would your position be?

9 A I would still be in  
10 opposition to it. You must understand that the  
11 considerations we gave to the Richards Island thing,  
12 we were able to, in our mind, feel that we had come up  
13 with the period of a year that would not totally  
14 eliminate the environmental impact but would minimize  
15 the environmental impact for that restricted area, but  
16 restricted approximately I guess more importantly that  
17 area of Richards Island.

18 Now, on a similar projection  
19 to talk about the coastal plain, as far as I'm  
20 concerned, that's a totally different story and I would  
21 be in opposition to that.

22 Q Okay. And it's a totally  
23 different story, as I understand you, because in one  
24 case you're talking about four hundred miles and in the  
25 amendments to your construction plan, you're talking  
26 about fifty miles. Am I right in that?

27 A I won't agree in the  
28 reference to the fact of the differences in the mileages.  
29 I will say the difference relates to the biological  
30 activity in the periods for which you can best do the





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 construction activity with the most minimal amount of  
2 impact in that area. I feel that as we stated here,  
3 we aren't eliminating the impact but we have a period  
4 upon which for the majority of our construction, we  
5 are going to have a minimalization of that environmental  
6 impact.

7 Now, whether you can come up  
8 with the same period on the coastal plains, the  
9 information we've sort of reviewed or seen to date is  
10 questionable on that and that would require a very,  
11 very serious decision on our part if that was put to  
12 us.

13 Q What I understand the  
14 environmental people to be concerned about, and all that  
15 I've ever heard speak about it, being adamantly opposed  
16 to the construction of a road or a gravel pad or whatever  
17 you want to describe it as along the North Slope is not  
18 just the short-term but the long-term implications,  
19 the long-term impact of building that road. Do I  
20 understand the state of the argument so  
21 far as a road along the North Slope is concerned?

22 A Well, I guess based on  
23 that kind of statement you've made, yes, but I think  
24 perhaps to take it one step further, I'd understood  
25 that the potential consequence of something like that,  
26 a gravel pad or something, might be creating a certain  
27 amount of barrier to whatever activity was going on up  
28 there. The similar concern was raised, was it not,  
29 about even a pipeline activity in respect to the caribou  
30 migrations and I had understood, you know, from evidence



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 that I understood has been led here before this Inquiry  
2 that things like roads, gravel pads, and these kinds  
3 of things are potentially damaging to migratory activity  
4 to certain types of animals.

5 Q Would it be an ecological  
6 disaster if Foothills or Arctic Gas tried to build  
7 their respective projects down the Mackenzie Valley  
8 during the summer construction? You've got an  
9 opinion about that surely.

10 A Well, it depends upon  
11 which aspect of the ecological disaster your defining.  
12 On a physical base, I don't think you have the support  
13 stability along the Mackenzie Valley if you build in  
14 the summertime. Biologically perhaps, it has been  
15 said here too, perhaps you're not dealing with the  
16 types of end to end biological concerns in the Mackenzie  
17 Valley which you might have to deal with. I think you  
18 have to differentiate the two points in terms of an  
19 ecological disaster in the Mackenzie Valley.

20 Q Would it be an ecological  
21 disaster if either Foothills or Arctic Gas tried to  
22 build the Prudhoe Bay lay during the summer construction  
23 using a gravel pad?

24 A I can't answer that.  
25 I don't know enough information to allow me to draw  
26 that comparison on those two things. I will agree and  
27 I think it's been evident too that there appears to  
28 be much more biological activity on that northern  
29 coastal area that potentially could be a problem to  
30 anyone building a pipeline in that area. You come into



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 a very remote sensitive area.

2 Q Excuse me a minute,  
3 Mr. Commissioner. Excuse me gentlemen. Do you have a  
4 copy of what's now Exhibit 847 at this Inquiry? Do you  
5 have another copy?

6 WITNESS KOSTEN: No, I'm  
7 afraid I don't.

8 Q Could I hand you 847, sir,  
9 so you can follow this. Would you, sir, take Exhibit  
10 847 and draw a line through the minus thirty-five  
11 degrees temperature on that graph. I'm sorry, on that  
12 table.

13 Could I show the exhibit,  
14 sir. The witness has joined--has drawn a curve through  
15 the minus thirty-five degrees temperature.

16 THE COMMISSIONER: Okay. You  
17 can have that back. I've drawn the same line, Mr.  
18 Kosten.

19 Q Now, could we look at  
20 this exhibit and can you first of all tell me if you  
21 agree with me that down the lefthand column is shown  
22 the wind speed?

23 A That's correct.

24 Q And across the top is  
25 the temperature. Is that correct.

26 A That's right.

27 Q And the line that you've  
28 drawn on the exhibit joins minus thirty-five degrees.  
29 Is that correct?

30 A That's correct.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q Over the range shown on  
2 the scale.

3 A That's correct.

4 Q Now, will it be impossible  
5 for men to work at minus ten degrees with a ten mile  
6 per hour wind?





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 A No minus ten.  
2 Q Well, look on the scale.  
3 A Minus ten and what was  
4 your wind?  
5 Q Ten miles.  
6 A No sir.  
7 Q How close are you to the  
8 crucial shutdown?  
9 A Well, I guess my position  
10 on that would be that you wouldn't, if you had only  
11 one day of this, that you probably would be able to  
12 work; but if you had a sustained period of this con-  
13 dition --  
14 Q Well, what's a sustained  
15 period? What do you mean by "sustained period"?  
16 A A week, say.  
17 Q Well, is that just a  
18 guess, a week?  
19 A That's been our past  
20 experience.  
21 Q Where?  
22 A In the Zamma Lake  
23 area in Northern Alberta.  
24 Q In exactly one week,  
25 it's a total of one week?  
26 A It's not exactly; if  
27 you have a prolonged period, if you have one or two  
days then you would probably try and work. But if  
you have a prolonged period of a condition that  
you're into the cold range, that you aren't getting



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 productivity, your equipment starts breaking down  
2 on you, you have additional -- your mechanics have  
3 problems keeping up with the equipment breakdowns,  
4 and it becomes uneconomical, and you find a lack of  
5 productivity dropping off to the point where it be-  
6 comes uneconomical to continue your operation.

7 Q Are you serious? Are  
8 you trying to tell this Inquiry that equipment is  
9 affected by wind chill?

10 A Not by wind chill,  
11 no sir.

12 Q Well, that's what you  
13 said, isn't it?

14 A O.K., the --

15 Q Would you like to  
16 withdraw that?

17 A O.K., if that's the  
18 impression that I left, yes sir.

19 Q Well, that's what you  
20 said, I believe. Do you mean that?

21 A But your shutdown is  
22 also affected by the ability of your men to perform  
23 effectively in that -- under those conditions.

24 Q That's what I want to  
25 ask you about. It's your evidence that no men -- that  
26 no man or group of men can be expected to work beyond  
27 one week at a wind velocity of 10 miles per hour and  
28 at a temperature of minus 10.

29 A My evidence is --

30 Q Is that what you say?



A To the point where it





Mirosh, Byers, Kosten  
C ross-Exam by Steeves

1 becomes -- does not become economical to keep your  
2 operation going because you're not getting enough work  
3 done to justify the cost.

4 Q What do you base that on?

5 A Experience.

6 Q Where?

7 A My own experience on the  
8 first job that we tackled in the winter in the Swan  
9 Hills area of Alberta.

10 Q What year was that?

11 I'd like to look at the records, please.

12 A I believe it was 1962

13 or thereabouts.

14 Q And you had sustained

15 periods where the position was minus 35 degrees or  
16 worse --

17 A Well --

18 Q -- is that what you're

19 telling me?

20 A This is an approximation

21 of the point at which you have to take a look at  
22 whether you're going to keep your job going or you  
23 can start it. Now, this situation occurred to us on  
24 the Peace River, the Zama end of the Peace River  
25 line.

26 Q What happened?

27 A We ran into a series  
28 of days of cold weather and after about a week of  
29 it we shut the job down because we weren't getting --

30 Q How cold?



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 A I beg your pardon?

2 Q How cold? How cold?

3 A Well, I can't give you  
4 the records because I don't have them. These are with  
5 the company now and I didn't take them with me.

6 Q Do you want to move  
7 up a little bit? Let's go to five degrees below and  
8 let's go to 13 miles per hour. Are you with me?

9 A Yes.

10 Q After a week of that  
11 the men's productivity will drop 50%?

12 A Your numbers are 5 below  
13 and?

14 Q I have trouble reading  
15 it too. Yes, five below --

16 A And 13 miles an hour?

17 Q Yes.

18 A No, I don't believe --  
19 I think you'd continue working.

20 Q For a week?

21 A Yes.

22 Q Two weeks?

23 A I think so.

24 Q Three weeks, a month?

25 A Well, the criterion  
26 is that when you start getting beyond 35 for, minus  
27 35 for a long period of time then I think --

28 Q Well, aren't you beyond  
29 below 35 at that point?

30 A Not on my chart.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q You're right on it,  
2 aren't you?

3 A I'm very close to it.

4 Q O.K.

5 A I don't think 35 -- it's  
6 when you get into that range.

7 Q What range?

8 A Of 35 degrees.

9 Q 35 to what?

10 A I beg your pardon?

11 Q You said a range. What  
12 range?

13 A Yes, I think that if  
14 you have one day when you had a condition where you  
15 were at minus 40, and you had been working, I think  
16 you could still probably continue to try and work,  
17 but if you had a prolonged period of it, then I think  
18 you'd be in trouble.

19 Q All right, now we're  
20 getting to the heart of the matter.

21 A It's the --

22 Q Pardon?

23 A It's the prolonged  
24 period of --

25 Q That's what I want to  
26 talk about.

27 A -- temperatures in  
28 these ranges, where you're starting to get into  
29 trouble with your productivity.

30 Q Have you investigated



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 the past history of the length of period at which you  
2 had low temperatures in the area of this 50-miles  
3 under construction?

4 A Would you repeat the  
5 question again, please?

6 Q Have you investigated  
7 the length of the period during which you have these  
8 conditions combined together to make it less than  
9 minus 35 degrees --

10 A Yes.

11 Q -- in the area where  
12 you're going to do this construction in the summer ?

13 A This is summarized in  
14 the --

15 Q I don't want the summary,  
16 I want the work, I want to see the work.

17 A I'm sorry, I don't --  
18 what do you mean by "investigated"?

19 Q Well, did you go to  
20 the weather office?

21 A This is where they came  
22 from.

23 Q O.K., and can you,  
24 using those Environment Canada records, point out to  
25 me the prolonged periods of the kinds you're talking  
26 about?

27 A Yes sir. I'd be glad  
28 to.

29 Q The Environment Canada  
30 records?





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 A No, not the Environment

2 --

3 Q What are you pointing  
4 out to me?

5 A Wind chill, I'm sorry,  
6 it's the new ones that I used, 1974.

7 Q O.K.

8 A O.K., this says --

9 Q These sheets are month  
10 by month and day by day, are they not?

11 A That's correct.

12 Q Well, tell me about it.

13 A March, year 1974, O.K.,  
14 the criteria here was noon.

15 Q Yes.

16 THE COMMISSIONER: Excuse me,  
17 Mr. Kosten. This isn't of enormous assistance to  
18 me, though it is to you. Would it help if Mr. Kosten  
19 had a few minutes to look at this, or would you prefer  
20 not to, Mr. Steeves?

21 MR. STEEVES: No, that's  
22 fine. I agree it's a good idea.

23 THE COMMISSIONER: All right,  
24 we'll adjourn for --

25 MR. STEEVES: Could I?

26 THE COMMISSIONER: Yes.

27 MR. STEEVES: I want to make  
28 absolutely certain you understand what I'm asking  
29 you to do, Mr. Kosten.

30 A Sorry.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 Q Do you understand what  
2 I'm asking you to do?

3 A O.K.

4 Q I'm asking you to look  
5 at those records and point out -- and those are  
6 historical records, are they not?

7 A Yes sir.

8 Q The periods shown on  
9 those records by month and by days where in your  
10 opinion the wind chill is so low for so long a period  
11 that you'd have to shut down?

12 A All right. I may simplify  
13 your question here by saying that the days that are  
14 shown in this summary here are averages of the days  
15 at which the temperature is -- wind chill temperature  
16 is 35 degrees, and I did not do an analysis of which  
17 periods of time. These are simply the days in each  
18 month at which the wind chill temperature is at  
19 minus 35 or less, and these were then taken for the  
20 five years and those numbers are summarized. So these  
21 are averages of the two locations.

22 Q But what you did in  
23 here in the introduction was you said, "Ah, there's one  
24 day wind chill <sup>at noon</sup> ~~was~~ 35 degrees or less." I'm not wor-  
25 ried about a week, but one day.

26 A That's what these  
27 figures represent here.

28 Q They don't reflect what  
29 you just told us, do they?

30 A Well --



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

Q I understand you to say  
that men can work for one, two, three, four, five, six,  
seven days at a wind chill of minus 35, and maybe more.  
But it's only when you get beyond that period that  
you'll have to shut down. I understand these figures  
every day where you've got a wind chill maybe isolated.





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1                                   A     This is the way these  
2 figures-- this is the way these figures were derived,  
3 yes.

4                                   Q     What they mean.

5  
6                                   A     No, they're not.

7                                   Q     Well, what do they mean?

8                                   A     They tell you during  
9 that period how many days you're going to lose.

10                                  THE COMMISSIONER: Let's  
11 stop for coffee, Mr. Kosten, but what I am concerned  
12 about here is that in this report on the proposed  
13 construction of a gravel work pad introduction. You  
14 say that a re-examination of the wind chill temperatures  
15 on the north coast led you to double essentially the  
16 number of days out of your ninety day working season  
17 calendar days that you'd lose. It went from twenty-  
18 one to forty-one.

19                                  A     Yes, sir.

20                                  Q     Now, you're telling me  
21 now that this isn't as simple as it first appeared.  
22 You don't just take minus thirty-five below, add up  
23 the number of days that the records show that that  
24 temperature was achieved either on the thermometer  
25 or by adding in wind chill to the thermometer reading,  
26 you say that in fact you can justify these figures  
27 in terms of the total number of days where you went  
28 below thirty-five below on the revised wind chill  
29 temperatures but as I understand your conversation  
30 with Mr. Steeves, you're saying that well one day isn't



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 enough. There has to be a period of days that would  
2 lead to a shut-down.

3 A Well, I think the governing  
4 factor here is that if you take the average condition  
5 that has occurred over the past five years and if you  
6 take all of the days that you could expect to reach  
7 that temperature at forty-six percent out of the  
8 forty-one out of eighty-nine, that gives you forty-six  
9 percent of the time you're going to find that kind of  
10 a condition.

11 Q Just so I understand this,  
12 that gives you the total number of days when you would  
13 achieve that temperature in one way or the other but  
14 it doesn't yield unless you examine those records in  
15 detail, as I understand it, the sustained periods when  
16 you would have to shut down. In other words, if you  
17 had one day when the temperature was that low, but  
18 only one day, you would keep on working. Now, I  
19 understand that it doesn't get cold one day and then  
20 go up the next and down and up and down and up. There  
21 must be a pattern to these things, but it would be  
22 useful if you could, during the coffee break, see if  
23 you can assist us a little more by examining those  
24 records.

25 Do I understand what you two  
26 have been talking about?

27 A Yes, I think so. I  
28 would like to add, however, sir, that if you have  
29 for instance a period of a week or so on the records  
30 and, then you end up with a day that shows that it's



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 above the thirty-five and then another prolonged period  
2 after that--

3 Q You wouldn't work the  
4 one day?

5 A You wouldn't say fire  
6 up that one day. So, there is some judgment that does  
7 enter into it.

8 Q Yes. Okay. Now, before  
9 we adjourn, could I ask--I don't ask, but let me just  
10 see if I understand the dispute between these two  
11 companies. Let me just take minutes of your time to  
12 outline it, so that if I'm not fully cognizant of the  
13 problem, you'll tell me.

14 My notes show that Mr.  
15 Williams originally felt that snow roads would be ready  
16 for haul by November 1st and that Mr. Jarvis felt they  
17 would be ready for haul by December 1st; that is on  
18 the North Slope and on the lower reaches of the delta.  
19 Now, Mr. Williams therefore felt that Arctic Gas could  
20 begin pipe laying November 1st. Foothills felt that  
21 given the fact that snow roads wouldn't be in place  
22 until December 1st, and given the problems of  
23 construction during December and January, they would  
24 not begin pipe laying until February 1st.

25 Now, both Mr. Williams and  
26 Mr. Kosten agreed that once you get down to thirty-  
27 five below, you can't work. That is my note of what  
28 Mr. Williams said. I'm not suggesting Arctic Gas is  
29 wedded to this but he was here many times and I think  
30 we all agreed he was a very able engineer. Now, then





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 we got to the question, well if you have to stop at  
2 thirty-five below, how many days do you lose? Mr.  
3 Kosten said you would lose twenty-five percent of your  
4 days. Mr. Williams said you'd lose thirty percent.

5 But Williams started with  
6 136 days, from December 1st to April 15th. So, if  
7 he took out thirty percent, he still had 92 left.  
8 Foothills, of course, started with only 90 days because  
9 of their abbreviated season, so they would not have  
10 a remaining number of days as great as Arctic Gas.

11 Now, Williams says--let me  
12 put it this way; you now say, Mr. Kosten, that you'll  
13 now lose not twenty-five percent of those days. You'll  
14 lose fifty percent and that's now why you've got to  
15 go to summer construction. Now, it seemed to me that  
16 Mr. Williams conceded that there were a number of  
17 factors that were very hard to predict and he might  
18 lose more than his ninety days out of 136. I haven't  
19 reviewed my notes on that but I'm putting this very  
20 roughly. But Mr. Williams then, so to speak, got back  
21 any days he'd lost because he extended his pipe laying  
22 season by a month, bringing it back into the fall by a  
23 month because he said a re-examination of the Inuvik  
24 snow road tests demonstrated that they could get the  
25 snow roads in place in time to begin pipe laying a  
26 month earlier than he had thought they would.

27 By the way, I think the  
28 original date he thought they could begin pipe laying  
29 was December 1st. I said November 1st at the outset.  
30 I think I was wrong. When he revised his figures on the





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 basis of the Inuvik snow road test, he thought he could  
2 have the snow roads in place November 1st and that gave  
3 him an extra month. So, that from November 1st to  
4 December 15th, he didn't have 136 days. He had 166.  
5 So, that if he lost more than the twenty-five percent,  
6 he'd still have enough working days left to finish  
7 the job on the North Slope.

8 Now, the Arctic Gas program  
9 on the North Slope is dependent on getting those snow  
10 roads in place either by--well, so that they're ready  
11 for haul either by October 1st or November 1st and  
12 dependent as well on the whole program of construction  
13 being able to be carried on throughout the mid-winter  
14 period, that is the month of December and January.  
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Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 And when we discussed that,  
2 we went into questions of artificial lighting, shelter,  
3 the darkness, the cold, moral and so on and so forth  
4 at considerable length. At any rate, that is my under-  
5 standing putting it as succinctly as I can of where  
6 these two companies part company, if I can put it that  
7 way and I think my summary is probably correct, except  
8 that I may have gotten Mr. Williams original dates a  
9 little bit mixed up. He dazzled me with his footwork  
10 there once in a while.

11 MR. MARSHALL: Mr. Commissioner  
12 there's one point from the summary that I -- that I  
13 think there's perhaps some confusion on. I believe  
14 Mr. Williams was talking about degrees Fahrenheit in  
15 the minus 35 what it related to temperature, whereas  
16 Mr. Kosten was talking about wind chill equivalent.

17 THE COMMISSIONER: Yes. I  
18 see.

19 WITNESS MIROSH: I believe  
20 Mr. Marshall, we can go into this in further detail  
21 with the next panel of witnesses, but from that chart  
22 that was just being cross-examined on for example,  
23 you see you can reach a wind chill equivalent of minus  
24 35 degrees Fahrenheit with a minus 10 degree temperature  
25 and a ten mile an hour wind for example or something  
26 very close to that. I think Mr. Williams was talking  
27 about temperatures below which he would not expect that  
28 the outside workers would be working.

29 THE COMMISSIONER: Yes, I  
30 follow you. I follow you.



Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1 WITNESS MIROSH: I wonder if  
2 I could make one comment on that. I do recall cross --  
3 participating in cross-examining Mr. Williams at the  
4 time and he stated that the minus 35 degrees was at  
5 zero wind and I believe left it at that.

6 THE COMMISSIONER: Yes, well  
7 you agree with Mr. Marshall then?

8 A Not totally. I would  
9 interpret the minus 35 to be wind chill in the way that  
10 it was determined earlier, but --

11 THE COMMISSIONER: Okay, well  
12 I -- well really I'm only putting it that way to make  
13 sure that I proceed through this afternoon and perhaps  
14 this evening, listening to all of you, I -- you under-  
15 stand the framework within which I'm considering your  
16 evidence and this isn't easy stuff to stay with. Did  
17 you want to say something Mr. Steeves?

18 MR. STEEVES: I'm sorry. I  
19 didn't mean to interrupt you. All I wanted to say,  
20 was what you have invited Mr. Kosten to do during the  
21 adjournment, is -- directly bears on a very important  
22 issue in this whole problem. Mr. Dau will be giving  
23 evidence and having done the kind of examination that  
24 I've asked Mr. Kosten -- invited Mr. Kosten to do, so  
25 it's quite important if I may say so with respect, that  
26 Mr. Kosten take all the time he needs and make that  
27 examination, and give as full and complete an answer  
28 as he can.

29 WITNESS KOSTEN: Okay I would  
30 like to deal with Mr. Steeves --





Mirosh, Byers, Kosten  
Cross-Exam by Steeves

1           and then to go through all of these sheets and  
2           to make the summary averaging -- we're talking about  
3           one page of this here or what are we talking about.

4                           THE COMMISSIONER: Well  
5           excuse me, excuse me Mr. Kosten and Mr. Steeves. Maybe  
6           Mr. Steeves and Mr. Goudge and Mr. Hollingworth will  
7           just talk to Mr. Kosten for a moment at coffee and  
8           figure out how to do that, so we don't sit here all  
9           afternoon and without getting anywhere and Mr. Kosten  
10          could do it at supper time, maybe, I don't know.  
11          So we'll stop for coffee.

12                   (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)

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Mirosh, Kosten, Byers  
C ross-Exam by Goudge

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. GOUDGE: Mr. Steeves?

MR. STEEVES: I have no further questions.

MR. HOLLINGWORTH: Perhaps we should outline the arrangement that we made prior to the coffee break, there was this question of Mr. Kosten going through all the charts at the request of Mr. Steeves. He's outlined the fact that there are subject calls throughout and we've agreed among counsel that he will undertake to do this and forward the material to all interested participants. I assume for the moment that all are interested, at the earliest possible time.

THE COMMISSIONER: O.K.

MR. GOUDGE: I can conclude the cross-examination of this panel, sir.

CROSS-EXAMINATION BY MR. GOUDGE:

Q Let me begin, Mr. Mirosh, by asking you some questions about your proposal concerning the gravel strip or gravel pad. I take it you propose that the digging of the ditch will be conducted from the pad and through the pad, is that so?

WITNESS MIROSH: Yes, that's correct.

Q And does that mean that the digging of the ditch will have to be done by a ditcher, but not with blasting?



Mirosh, Byers, Kosten  
Cross-Exam by Goudge

1 MR. HOLLINGWORTH: Pull the  
2 mike a little closer to you, Mr. Goudge ?

3 MR. GOUDGE: Sorry. Did  
4 you hear the question, Mr. Mirosh?

5 A Yes. You're asking  
6 whether we would be using a ditcher or blasting, and  
7 we may well require blasting to get through the active  
8 layer which will be frozen, of course, at that time.

9 Q Is it possible to  
10 blast for the purposes of ditching, once you lay the  
11 gravel strip?

12 A Yes, we think it is.

13 Q Would you have to take  
14 any precaution measures with the strip that you would  
15 not have to take blasting without the strip?

16 A Well, I think one thing,  
17 we'd be faced with a much lesser charge because  
18 we wouldn't be blasting as much frozen material as  
19 we would in other locations. As to precautions,  
20 perhaps Mr. Kosten can add to that. We have talked  
21 about using mats.

22 Q Mr. Kosten?

23 WITNESS KOSTEN: Well, I  
24 think that your precautions that you would drill  
25 through the top layer of it and to that extent, as  
26 Mr. Mirosh said, you'd have a lighter charge and I  
27 don't think that you would -- I think your question  
28 was, "Would you require any greater precaution there  
29 than elsewhere?" My opinion on that would be, "No."

30 Q Mr. Mirosh, has this



Mirosh, Byers, Kosten  
Cross-Exam by Goudge

1 technique of digging a ditch through a gravel pad  
2 been used anywhere that you know of previously?

3 WITNESS MIROSH: Well, I  
4 think in part on Alyeska, although they are digging  
5 off the side, in some cases on some of the spreads  
6 we say they effectively were digging through the pad  
7 because they were going through frozen active layer  
8 of material. In the sense of the sort of pad that  
9 we're describing, with the three feet of gravel and  
10 an insulation layer, I'm not aware that that  
11 particular configuration has been ditched.

12 Q Now, I take it your  
13 proposal will be that the ditch be open during the  
14 August 15-October 31 time frame that you speak of.  
15 Is that so?

16 A Yes. Parts will be  
17 open. We'll be in those cases we will be backfilling  
18 as soon as we can to minimize the amount of ditch  
19 degradation.

20 Q Yes, there's no doubt  
21 that there is a risk of some ditch degradation through  
22 the ditch being open at that time of year, is that  
23 so?

24 A Yes. We've -- there will  
25 be some slumping -- we have had our geothermal people  
26 estimate for us how much slumping we could expect from  
27 melt of the ditch wall. We don't expect a great deal  
28 but I think we've been advised it could be half a  
29 foot to a foot of the ditch wall could collapse in a  
30 period of a week.





Mirosh, Byers, Kosten  
Cross-Exam by Goudge

1 Q In a period of a week?

2 A Yes.

3 Q What kind of time frame  
4 does your construction plan call for insofar as the  
5 ditch being open is concerned? What opening time  
6 is there going to be? What time is the ditch going  
7 to be --

8 WITNESS KOSTEN: I would  
9 expect possibly about a week.

10 Q How does that compare  
11 with your winter construction technique?

12 A Well, for your eventual  
13 winter technique, your ditch behind your welding  
14 operation, you lower your pipe in and it's within --  
15 you try to get it in and backfilled the same day, that  
16 you actually open your ditch up.

17 Q Have you done any field  
18 tests to see whether the theoretical information you've  
19 received as to slump is accurate

20 WITNESS MIROSH:

No sir, we have not.

21 Q Do you intend to do any?

22 A I expect we would but  
23 we haven't planned a program for it. To me it wouldn't  
24 be a very significant problem, but I'm sure that we  
25 would check it out.

26 Q Then when the operation  
27 is completed, you have the long-run strip that you  
28 spoke of with Mr. Steeves this morning, and I take  
29 it your view, Mr. Mirosh, is that the main concern  
30 over the long run is the drainage problem presented



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1 by that gravel strip; is that so?

2 A Yes, in the  
3 long run, although I'm not an environmentalist, my  
4 own intuition would lead me to believe that drainage  
5 across the pad, maintaining drainage across the pad  
6 would be the most important consideration.

7 Q Mr. Byers, I take it  
8 you have another concern as well, and that is that  
9 the gravel strip may through its attractiveness to  
10 all-terrain vehicles, provide a measure of greater  
11 human access to that part of the delta than would  
12 otherwise be the case. Is that so?

13 WITNESS BYERS: Not in the  
14 sense that people with all-terrain vehicles would  
15 necessarily rush up there to travel across it. That  
16 was a situation that had been identified to us by  
17 some of our consulting people. They were concerned  
18 that regardless of all-terrain vehicles, this pad  
19 would provide more access to the area, regardless of  
20 the means a person would use to get there.

21 Q Yes, and I take it  
22 at the moment you've identified that concern, but not  
23 considered any possible solutions to the concern.

24 A Well, we've talked of  
25 solutions. You know, the kind of things that people  
26 suggesting that you control access onto the thing and  
27 the obvious response to that comes, "Well, what do you  
28 do? Do you put up a fence or do you put up concrete  
29 barriers or something similar to that along this  
30 right-of-way?"



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1 As to the practicalities  
2 of those things, if a person is capable of travelling  
3 along this gravel pad, for instance, and he comes to  
4 one of these barriers and he's not just as capable  
5 of going around it, you know, rather than just  
6 assuming that because it's there he has to stop,  
7 we then thought that perhaps by removing the facilities  
8 to allow people to get across drainage courses and  
9 things like that would perhaps be sufficient for what  
10 we've looked at to date. You know, obviously as I  
11 said before, we consider these as a concern we're  
12 still playing with that problem, I guess. Not  
13 playing, but we're still considering it.

14 Q You're still addressing  
15 it. You're still addressing the problem and I take  
16 it that none of the mitigative measures you've been  
17 considering is, in your view, sufficiently practical  
18 to allow you to rest easy on the problem.

19 A Yes sir, that's correct.

20 Q Now, Mr. Kosten, you  
21 say in addressing one of the other matters that the  
22 evidence speaks to, that there is a need or that there  
23 is profit to be gained by separating the mainline  
24 construction crew from the compressor station construc-  
25 tion crew, and hence you concluded that it's prefer-  
26 able to move the mainline construction crews to  
27 wharfesites. Is that a fair summary of your position?

28 WITNESS KOSTEN: This is  
29 generally the case, that your trades involved in the  
30 mainline pipeline construction are different, while





1 for instance your welders may be the same union,  
2 you're talking about a different type of welder, for  
3 instance. You also have additional trades associated  
4 with the building trades which are your compressor  
5 station construction people such as electricians,  
6 and carpenters and so forth. You have steelworkers,  
7 which you do not normally have in the mainline  
8 pipeline construction operation.

9 Q Yes.

10 A And in my opinion it  
11 is normal practice that they don't operate out of  
12 the same camp.

13 Q Do you mean by that  
14 that it's your experience in the pipeline industry  
15 that the two camps with their attendant trades are  
16 separated?

17 A This is generally what  
18 happens, yes.

19 Q Are they doing that  
20 in the Alyeska project, do you know?

21 A Well, I think that they  
22 have separate camps for the pump stations. The pump  
23 station camps are right at the pump station locations,  
24 at least we were at one where this was the case.  
25 They maybe mixing them in some instances, but I believe  
26 this is the case. I could be subject to -- it's an  
27 opinion I'm stating.

28 Q And could you be a little  
29 more specific for me as to the consequence you would  
30 foresee if the camps were mixed, and the trades for



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1 each of the projects, the mainline and the camps, and  
2 the compressor stations, were housed in the same  
3 camp?

4 A I don't think that  
5 there would be any consequence of mixing them. What  
6 I'm saying is if you have the opportunity to do so,  
7 you normally would prefer to have them separated.

8 Q If there's no great  
9 consequence from mixing them, I wonder why there is  
10 any advantage to separating them?

11 A Well, your mainline  
12 crews deal with -- our basic reasoning for switching  
13 the camp location was to put the mainline crews where  
14 they are operating from, say, an established warehouse  
15 storage area type, that is where their material comes  
16 from. The compressor station camps, we are working  
17 through the summer and this is why we chose to leave  
18 the compressor station camps at the compressor station  
19 sites.

20 Q You're not suggesting,  
21 I take it, that there would be any labor unrest  
22 through jurisdictional disputes or anything like that  
23 because of the fact that the crews for the two  
24 projects would be housed at the same camp?

25 A Well, I guess there's  
26 always a possibility. I think -- I don't think it  
27 would be all that serious.

28 Q And I take it, there-  
29 fore, that that possibility is not in any sense a  
30 major motivating factor pushing you to moving your main-



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1 line camps to wharfsites.

2 A No, the basic reason  
3 was to be able to get at the erection of the camps,  
4 the major camps, so that you require for the mainline  
5 at the stockpile sites where your material is  
6 delivered.

7 Q Now lastly, Mr. Mirosh,  
8 you say in your evidence that you have as well  
9 decided to introduce a single pipeline construction  
10 spread working a year in advance of the first year  
11 of mainline construction, and I think that's in the  
12 vicinity of the Milepost 650 area, is that correct?

13 WITNESS MIROSH: Yes, I  
14 believe it's in the Wrigley area.

15 Q Yes.

16 A Fort Simpson area.

17 Q I simply don't understand  
18 what that does to the rest of your construction  
19 schedule. Are you putting everything else back a  
20 year, or is that single spread going to be into the  
21 field without the prior work that the other spreads  
22 will require following the granting of a permit?

23 A No, that single spread  
24 will be pushed ahead a year, rather than the others  
25 going back a year, and in the case of that single  
26 spread the clearing will take place during the  
27 same time or immediately prior to pipeline construc-  
28 tion rather than a year in advance.

29 Q And I take it that  
30 spread not only permits you to get the bugs out of



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1 certain of your operations, but may as well be used  
2 as a training device for some of the employees that  
3 will be engaged on the project in subsequent winters,  
4 is that correct?

5 A Well, I think that  
6 will be a by-product, but our main thought here  
7 would be to address ourselves to the environmental  
8 construction interface problems, as I've put in the  
9 evidence, and to sort these things out before we  
10 get into the major expenditures of putting many more  
11 spreads on the field.

12 Q There is no doubt,  
13 though, that it presents a training opportunity, and  
14 I take it you'd take advantage of that.

15 A I think as far as  
16 training Foothills staff, yes, I imagine we would  
17 probably try and put into the field a competent  
18 spread though, for pipeline construction, rather than  
19 one that was filled with a number of trainees.

20 MR. GOUDGE: Thank you.  
21 Those are all the questions I have of this panel,  
22 sir.

23 THE COMMISSIONER: Any re-  
24 examination?

25 MR. HOLLINGWORTH: No  
26 re-examination.

27 THE COMMISSIONER: All right,  
28 well thank you very much, Mr, Mirosh, Mr. Kosten,  
29 Mr. Byers. It's nice to see you again and to see you  
30 well and feeling better, Mr. Kosten.

(WITNESSES ASIDE)





1 MR. GOUDGE: Sir, if we could  
2 stretch our legs for a minute and the next panel  
3 could assume the witness stand?

4 THE COMMISSIONER: O.K.

5 (PROCEEDINGS ADJOURNED FOR A FEW MINUTES)  
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(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

MR. GOUDGE: We are prepared to resume, sir. Mr. Marshall is going to lead this panel for Canadian Arctic Gas.

O. JOHANSON

O. W. FOWLER

R. D. WALKER

W. L. DANIELS, sworn:

J. E. RYMES

P. H. DAU, resumed:

MR. STEEVES: I wonder if I might say something to you before my friend and associate Mr. Marshall begins. I want to speak to you about the question of frost heaves and I'm instructed to give you some information about that topic.

We have recently discovered a malfunction in the apparatus used in connection with tests conducted by Northern Engineering Services to determine frost heave effects on the unfrozen soils in the permafrost areas along the pipeline route. Investigations are presently underway which we do not expect to be completed until well after the now anticipated closing of the record of this Inquiry.

On September 10th last the National Energy Board indicated that it wished to hear further evidence from Arctic Gas and Foothills in relation to frost heave and suggested that this be done after the completion of the Board's phase 2D. Arctic Gas does not expect phase 2D to be completed until December of this year. The results of the investigations



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1 presently underway will be fully dealt with by the  
2 National Energy Board at that time. Accordingly, in  
3 its final submission to this Inquiry, Arctic Gas will  
4 take the position that the matter of frost heave will  
5 receive further consideration that this Inquiry is  
6 not in the position to make any specific findings in  
7 this regard and that the issue is one that will have  
8 to be settled to the satisfaction of the National  
9 Energy Board.

10 THE COMMISSIONER: Well, it  
11 would be nice to know what the malfunction was.

12 MR. STEEVES: What it was?

13 THE COMMISSIONER: Was it the  
14 equipment used to test? Is that the problem? It's  
15 not a theoretical difficulty, I gather?

16 MR. STEEVES: Oh, no, no.  
17 Not at all. Not at all. The difficulty is this sir;  
18 the test cells that were used to determine shut-off  
19 pressures were found--the membrane which is a component  
20 of that test cell, was found to contain a minute leak,  
21 which allowed atmospheric pressure to become involved  
22 in the apparatus. The effect of that is not fully  
23 understood and requires some investigation. That's  
24 the investigation that's referred to here.

25 THE COMMISSIONER: Right.  
26 Well, we understand your position and we'll let  
27 everyone digest it.

28 MR. MARSHALL:

29 Thank you, sir. Mr.  
30 Commissioner, I would like now to call evidence of a





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1 panel of witnesses dealing with North Slope construction  
2 productivity. The members of the panel have been--  
3 starting on the left, Mr. Olaf Johanson is president  
4 of Banister Pipelines Edmonton. Next to him,  
5 Mr. Oliver Fowler, construction manager, Brown & Root,  
6 San Francisco. Next to him, Mr. John Rymes who has  
7 testified before in the hearings in the south. Mr.  
8 Rymes is a consulting engineer and the president of  
9 J. E. Rymes Engineering Limited. Next to him, Mr.  
10 Dick Walker; Vice-president engineering and operations  
11 for Trans-Canada Pipeline Toronto. Next to him, Mr.  
12 Bill Daniels, senior construction manager for Arctic  
13 Gas and the gentlemen on the end is known to you,  
14 Mr. Phil Dau, president of Northern Engineering  
15 Services.

16 Sir, the evidence of the  
17 panel has been distributed and I've asked Miss  
18 Hutchinson if she could give that an exhibit number.  
19 I'll leave the copy that I have with her, sir, at the  
20 completion of the day as it has the originals of the  
21 photographs in it.

22 DIRECT EXAMINATION BY MR. MARSHALL:

23 Gentlemen, are there any  
24 corrections or additions to your filed evidence, which  
25 has now been marked Exhibit 848? Mr. Johanson?

26 WITNESS JOHANSON: Are you  
27 talking about the filed evidence?

28 Q Yes sir.

29 A Not to my knowledge.

30 Q Do any of the members of  
the panel have any corrections or additions to the filed



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1 evidence, the white bound volume marked Exhibit 848?  
2 Gentlemen, if asked the same questions today as set  
3 forth in the prepared direct evidence, Exhibit 848,  
4 would you give the same answers as stated therein?  
5 Mr. Johanson?

6 WITNESS JOHANSON: Yes.

7 Q Mr. Fowler?

8 WITNESS FOWLER: Yes.

9 Q Mr. Rymes?

10 WITNESS RYMES: Yes.

11 Q Mr. Walker?

12 WITNESS WALKER: Yes.

13 Q Mr. Daniels?

14 WITNESS DANIELS: Yes.

15 Q Mr. Dau?

16 WITNESS DAU: Yes.

17 Q Filed with the evidence  
18 was Appendix A to the testimony of Mr. P. H. Dau and  
19 I'd ask that that be given Exhibit 849. Filed as well,  
20 sir, was the transcript of proceedings for the National  
21 Energy Board from September 8, 9, and 10 of this year.  
22 That, sir, was the cross-examination of this panel,  
23 less Mr. Dau on testimony the same as given here in  
24 these proceedings and the filed direct evidence has  
25 not been included with this but the whole cross-  
26 examination is contained in it. I ask that that be  
27 given the Exhibit 850.

28 Mr. Johanson, I understand  
29 that in reviewing the transcript of the N. E. B.  
30 proceedings, that you have discovered a small error at



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1 page 11,753. I wonder if you might just speak to that  
2 now.

3 WITNESS JOHANSON: Yes, I have.  
4 I quoted the weight of a 594 sideboom at 200,000  
5 pounds when in fact that is the lifting capacity.  
6 The weight should have read 127,000 pounds.

7 Q Thank you. Do any of  
8 you other gentlemen have corrections that ought to  
9 be made to the N. E. B. transcript, Exhibit 850 in  
10 these proceedings? Well, gentlemen, if asked these  
11 same questions as were put to you as set out in the  
12 transcript, would you give the same answers today?  
13 Mr. Johanson?

14 A Yes, I would.

15 Q Mr. Fowler?

16 WITNESS FOWLER: Yes.

17 Q Mr. Rymes?

18 WITNESS RYMES: Yes sir, I  
19 would.

20 Q Mr. Walker?

21 WITNESS WALKER: Yes sir.

22 Q Mr. Daniels?

23 WITNESS DANIELS: Yes.

24 Q Mr. Dau? You were not  
25 there.

26 WITNESS DAU: I was not on the  
27 panel. The answer is yes.

28 Q I don't think the answer  
29 can be yes, Mr. Dau. Now subject to your approval  
30 sir, I don't propose to have the panel read in its filed



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1 direct testimony. I would, however, like to ask a  
2 couple of questions of each of the panel members,  
3 highlighting certain aspects of their testimony  
4 which may be of some assistance to you. To begin  
5 with Mr. Walker, you've had compiled summary sheets  
6 which were filed with the National Energy Board and  
7 are referred to in the transcript, Exhibit 850.  
8 I would like to file these summary sheets with this  
9 Inquiry as well, sir. Mr. Walker, do you have a  
10 copy of the document in front of you?  
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1 WITNESS WALKER: Yes sir.

2 Q Could you explain for  
3 the purposes of the record, what the -- what information  
4 the document contains?

5 A These documents are a  
6 summary of the work that was carried out by Trans  
7 Canada Pipelines during 1972 - '73 and '74 in its  
8 winter construction. Now the sheets show, a summary  
9 sheet for the whole year and then there are backup  
10 sheets for each section of loopline that was constructed  
11 and these backup sheets for each section show the number  
12 of welders that took part in that work, the number of  
13 wells that were completed each day, the footage of  
14 pipe welded per day, the footage of pipe coated and  
15 lowered in there and the number of working days on  
16 which that work was carried out. A listing of the  
17 approximate work force for the entire spread is shown  
18 along with temperature data for the days that are  
19 recorded, the temperature data, the high and low temp-  
20 eratures recorded by Environment Canada for the closest  
21 Environment Canada Weather Station to where the work  
22 was going on. On the bottom of each backup sheet,  
23 there is data pertaining to the type of terrain, whether  
24 it was swamp, or muskeg or rock and a few other comments  
25 as to when work was not carried on.

26 Q Would it be fair to say  
27 Mr. Walker, that the summary sheets set forth the  
28 statistical information upon which you rely in your  
29 testimony?

30 A Yes sir.



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1 Q Might we mark the summary  
2 sheet sir, as Exhibit 851? Mr. Johanson, you have  
3 appended to your evidence as Exhibit -- or Appendix V  
4 three photographs of an environmental weld building.  
5 Sir, I have an extra set of those that I'll leave with  
6 Miss Hutchinson for marking as an Exhibit and I'd ask  
7 that they could be given Exhibit #852 collectively.

8 Mr. Johanson, could you des-  
9 cribe the building that's depicted in these photographs  
10 and the operations that are carried out therein please?

11 WITNESS JOHANSON: Yes, the  
12 building is 110 feet long and 12 feet wide. It has  
13 a series of electric hoists and other equipment inside.  
14 The pipe is brought in at one end where it is -- the  
15 ends are prepared and the pre-heating takes place and  
16 it goes to the line-up station where the stringer bead  
17 is run, from there to a hot pass station and from that  
18 point it exits the building and the final welding --  
19 there was three capping stations I'd done in other  
20 buildings, adjacent to this one, smaller buildings.  
21 The building is heated and through the use of the --  
22 this type of building on the gathering system at Prudhoe  
23 Bay we lost only one day of work during the past winter.

24 Q Sir, this would be the  
25 Arctic work shelter that's described in page 7 of your  
26 testimony in answer to question number 14, was it not?

27 A Yes it is.

28 Q Mr. Johanson, you make  
29 reference in your testimony to the banister model 710  
30 ditcher. I understand there's some booklets containing



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1 a descsription and photographs of that ditcher that  
2 ought to be here within an hour or so.

3 A Yes, we're expecting them  
4 very shortly and there are several copies for dis-  
5 tribution as you wish.

6 Q Fine. I'd like Mr.  
7 Johanson just to run through that when they arrive sir.

8 Mr. Fowler, you took a number  
9 of photographs of the work site that Brown & Root was  
10 working at over the past number of seasons at Prudhoe  
11 Bay and I've had the set of photographs numbered one  
12 through 15 and I have a couple of copies of them sir.  
13 I would like to have them entered as the next exhibit,  
14 which would be exhibit 853 and I'd like to -- Mr. Fowler  
15 if you would please sir, to go through the numbered  
16 photographs and indicate what is shown on the photo-  
17 graphs.

18 WITNESS FOWLER: Number one  
19 shows the pipeline right-of-way along 34 inch crude and  
20 34 inch natural gas pipeline leaving gathering centre  
21 number one.

22 Photographs two, three, four,  
23 five, six, seven, eight, nine at various locations  
24 along the 38 inch natural gas line from gathering centre  
25 number three to the central gas compression plant.

26 Q Mr. Fowler, if I can  
27 stop you for a moment. I notice photograph number two  
28 shows a gravel work pad or road on one side and then  
29 the next photograph, photo number three doesn't seem  
30 to show the road. Perhaps it's taken from the other





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1 side of the -- of the line. My question is, in carrying  
2 out the work where were your forces located? Were they  
3 working from the pad, or partly from the pad and partly  
4 on the other side, what was the situation?

5 A All the welding -- I mean  
6 all the drilling for the support installation was done  
7 on the tundra off of the road and the setting of the  
8 supports was performed on the tundra, the work. The  
9 stringing of the pipeline, the pipe, the 38 inch pipe  
10 was mainly strung along the road with the welding and  
11 setting of the pipes, the majority of that work was  
12 done from the tundra.

13 Q Now sir, the work that  
14 was done on the tundra that you've described, was that  
15 on a snow road or snow pad of some sort?

16 A It was on a snow pad,  
17 and I took these photographs since we had worked to  
18 try out the equipment on the snow pad and we were  
19 drilling the holes and constructing the pipe, laying  
20 the pipe to show the effect of the working of the  
21 equipment on the tundra and I could detect very little  
22 and at sometimes the thickness of the snow pad on the  
23 high points where the tundra underlays was approximately  
24 two to three inches was all the snow pad we had.

25  
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30



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1  
2 MR. VEALE: Mr. Marshall,  
3 excuse me. The snow pad is with reference to the  
4 38-inch line? I'm confused there.

5 MR. MARSHALL: Well, Mr.  
6 Fowler, these photographs, for example photograph  
7 No. 3, shows the 38-inch line, does it?

8 A That is correct.

9 Q And on the side in  
10 the foreground of the picture, the grassed area, that  
11 would be the area where you had your snow pad?

12 A That's correct.

13 Q And what operations  
14 were you carrying out from that pad?

15 A The drilling operations  
16 and the setting of the supports, and the laying of the  
17 38-inch pipeline.

18 Q Now, when you say you  
19 were working on a pad, could you tell us something  
20 about the pad? Was this a specially designed snow  
21 road, processed snow road, or how was it designed  
22 and built?

23 A By the time the Alaska  
24 State authorities would allow the construction crews  
25 to enter onto the tundra, there had been enough  
26 snow accumulate along the side of the road that we  
27 had to take a dozer and a motor grader and smooth  
28 this out to work off of.

29 Q Do I understand  
30 correctly then that when you say "a snow pad" you mean



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1 an area where you had smoothed out the snow with  
2 a motor grader?

3 A That's correct.

4 Q Not a processed snow  
5 road built up through compaction and using a  
6 pulvi-mixer and so on.

7 A This was not necessary.  
8 The snow that had drifted in next to the gravel pad,  
9 we just smoothed that out and worked right on it.

10 Q Now, you mentioned a  
11 date that you were allowed to start work on the tundra,  
12 by the state authorities. When was that, sir?

13 A The earliest was November  
14 3rd, and this last spring we were allowed to stay on  
15 the tundra till May 28th. But normally this is around  
16 the middle of November and the middle of May.

17 Q Now, sir, you were in  
18 the process of describing what's depicted in these  
19 photographs. Would you carry on with that, sir?  
20 We got up to No. 10.

21 A No. 10.

22 Q No. 9 is the one with  
23 the small caribou, that's right along the pipeline.

24 A That's correct. The  
25 pipeline will be just below the bottom of the  
26 photograph.

27 Q I have a prompter and  
28 I've been asked to ask you why you would work from  
29 a snow pad if you had a gravel pad. Why would you  
30 work from both a gravel pad and a snow pad on the



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1  
2 other side of the pipeline?

3 A To drill a hole we had  
4 -- we controlled the elevation in the alignment of  
5 our supports, we controlled the elevation within a  
6 quarter of an inch because we were placing the pipe  
7 and that was vertical elevation. Horizontal elevation  
8 we controlled within a half an inch.

9 Q Now that's the elevation  
10 of the pipe shown on these support members in the  
11 photographs, is it?

12 A Yes.

13 Q Those cradles that the  
14 pipe is sitting on?

15 A That is correct.

16 Q Yes.

17 A So to position our drill  
18 rigs we drilled a 16-foot hollow and to control  
19 the accuracy we had to get our drillrigs fairly level.  
20 We could not do this working off of the gravel pad,  
21 as you know it slopes off pretty steep. So we had to  
22 move the drill rigs that were mounted on foremost  
23 carriers and we had planned to work this way, to lay  
24 the 38-inch pipe with the pipelayers and cranes that  
25 we had to do the work. It was a lot better to work  
26 where we were down at the elevation of the supports  
27 and off of the tundra.

28 Q If I understand you  
29 correctly then, the road had been built up, say,  
30 five feet or so above the natural ground level and





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In C hief

1 you found it more convenient to be working closer  
2 to ground level when you were laying this 38-inch  
3 pipe.

4 A That's correct. The  
5 average elevation of the road above the tundra was  
6 five feet. The average elevation of the supports  
7 above the tundra was two feet.

8 Q So you did your drilling  
9 for the placement of the vertical support members from  
10 the snow pad and you also laid the pipe on the vertical  
11 support members working from that same snow pad with  
12 side boom tractors, didn't you?

13 A That's correct, yes.

14 Q What about the balance  
15 of the photographs? No. 10, Mr. Fowler.

16 A No. 10 is one of the  
17 producing well pads and shows the six-inch flow lines  
18 that comes from each of the individual production  
19 wells. In this area, while we were working on the  
20 tundra to install the expansion loop configuration  
21 that's shown, and this is one of the road crossings.

22 Q Mr. Fowler, it is dealt  
23 with in your file testimony but perhaps you could just  
24 briefly summarize the work that your company was  
25 involved in at Prudhoe Bay for the past number of  
26 seasons, involved in laying some large diameter pipe  
27 and some small diameter pipe, both.

28 A That's correct.

29 Q And all of it was  
30 elevated, was it?



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1  
2 A That's correct.

3 Q How much of each, sir,  
4 could you give us an idea?

5 A There was approximately  
6 155 miles of six-inch, seven miles of 38-inch, 12  
7 miles of 34-inch, and a couple of miles of 8-inch.

8 Q Thank you, sir. What  
9 about photograph 11?

10 A Photograph 11, 12, 13,  
11 14, and 15 are alongside the 38-inch gas line to the  
12 central compressing station plant. As I stated  
13 before in my testimony, most of the work for the six-  
14 inch flow lines was performed in the summer months.  
15 The work, the majority of the work for the 34 and 38-  
16 inch line was performed in winter months, and the  
17 38-inch line, the major proportion of the work was  
18 performed off the tundra on a snow pad road, and this  
19 is why I took more photographs along the 38-inch  
20 pipeline.

21 Q Thank you, Mr. Fowler.

22 Mr. Rymes, in answer 15 to  
23 your testimony, you dealt with the subject of development  
24 work on the proposed Arctic ditcher. I'd like to  
25 review that question and answer with you, sir, and  
26 have it read into the record. The question put to  
27 you at page 15 and question 15 was this:

28 "Mr. Rymes, would you discuss the factors  
29 being taken into consideration in development  
30 work on the proposed Arctic ditcher?"



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1 Would you give your answer  
2 to that question, sir.

3 WITNESS RYMES: Yes, I can  
4 Mr. Marshall. Excuse me, I have a rather bad cold so  
5 my voice may crack from time to time.

6 In the development of an  
7 Arctic ditcher, I've set out in the testimony some of  
8 the same factors that are involved and essentially  
9 they divide themselves into three basic categories.  
10 One is the piece of equipment itself, that is the  
11 ditcher. The other one relates to the teeth, that is  
12 the excavating teeth themselves. The third one  
13 attends to the geotechnical problems, that is the  
14 soil in which the ditcher is actually going to  
15 excavate.

16 If I might, I'd like to just  
17 read specifically in terms of the ditcher the con-  
18 siderations that you attend to relate to the wheel  
19 weight, the crowd speed, the wheel speed, the  
20 coefficient of traction, the weight and the weight  
21 distribution of the entire ditcher itself, the wheel  
22 horsepower, the side frame stiffness, and the width  
23 and the depth of the ultimate ditch.

24 In terms of the Arctic ditcher's  
25 teeth, that is the teeth that will be excavating the  
26 soil, you examine such things as the teeth pattern; the  
27 teeth shape; the cutting geometry; the tip temperatures;  
28 the tip velocity; the penetration; the type of teeth,  
29 that is whether they are chisels or rippers or different  
30 styles of teeth; the metallurgy; the hardness; the impact





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1 properties; abrasive resistance; the type of cutting  
2 mode, that is whether it is a block or a semi-block or  
3 un-block cutting mode and the heat treatment of the  
4 teeth themselves.

5 Turning to the geotechnical  
6 problems, these are examined in terms of abrasion  
7 resistance; the penetration hardness; the specific  
8 resistance to cutting; the temperatures, that is the  
9 soil temperatures; the moisture content; the soil  
10 makeup, that is whether it's gravel, silt, clay, sand  
11 or bolder content; impact properties of permafrost,  
12 coefficient of friction; and the soil grain size.  
13 That, ladies and gentlemen, is a very quick overview  
14 of what you'll /examine in the terms for development of an  
15 Arctic ditcher.

16 Q And sir, to what extent  
17 are you involved in this development or work now for  
18 Arctic Gas?

19 /are  
20 A We involved in the  
21 development of Arctic ditcher teeth and various  
22 classifications of Arctic ditcher teeth and we're also  
23 involved in the test programs that have been planned  
24 for and are related to Mr. Dau's testimony for this  
25 coming winter and we're also involved in the engineering  
26 and design of the new Arctic ditcher.

27 Q Thank you, Mr. Rymes.  
28 Mr. Daniels, you have appended three drawings of work  
29 shelters to your evidence, figures 1, 2 and 3. I  
30 wonder, sir, if you would explain those three figures  
to us and indicate the stage of developments that



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1 Arctic Gas is in with respect to these and any other  
2 similar shelters? Perhaps before you do, sir, I have  
3 additional copies and I'd like these marked as exhibits.  
4 I'll give them to Miss Hutchinson. I'd be Exhibit 854.

5 WITNESS DANIELS: In the  
6 cross-examination testimony from the National Energy  
7 Board which has now been filed before this hearing,  
8 Mr. Gibbs of Foothills Pipe Lines took me through the  
9 considerable dialogue describing these and we thought  
10 it would be helpful here if we brought some sample  
11 drawings and specifications of three of these shelter  
12 units which are only three of the--

13 THE COMMISSIONER: These ones?

14 A No, sir. That is the  
15 Banister shelter is in use on the North Slope.

16 Q I'm sorry.

17 MR. MARSHALL: So, the  
18 photograph that was included was with Mr. Johanson's  
19 testimony and that is the Arctic work shelter that  
20 Banister Pipelines was employing in its operations  
21 at Prudhoe Bay this past winter. The three sketches  
22 which I've handed to you are appended to Mr. Daniels'  
23 testimony, figures 1, 2 and 3 and those represent  
24 drawings of shelters that have been developed by Arctic  
25 Gas working in conjunction with others as Mr. Daniels  
26 will describe.

27 THE COMMISSIONER: These are  
28 in the design stage now?

29 MR. MARSHALL: Yes, sir.

30 THE COMMISSIONER: Sorry.



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1 A Over the past year,  
2 Arctic Gas has gone from conceptual design on a number  
3 of these. These three are only provided to be indicative  
4 of what's been done. We have in total done design on  
5 about fifteen or sixteen different types of shelters.  
6 All of these have been brought to the conceptual design  
7 period and are now at what we consider final design  
8 status.

9 MR. MARSHALL: Excuse me, sir.  
10 What to a layman does final design status mean? Have  
11 you got something you can build from or where do you  
12 stand?

13 A Yes, these drawings which  
14 we have given here as examples are at the stage where  
15 we can now hand these to a manufacturer and ask him  
16 then to produce his detailed shop drawings which would  
17 then be utilized to build the final units.

18 Q Just incidentally, sir,  
19 and I'm sorry to interrupt; they show the shelters  
20 themselves being mounted on track units. Now, are  
21 the pictures depicting a type of track unit that is  
22 currently in production?

23 A Yes, the manufacturer  
24 with whom we work almost entirely on the development  
25 of these shelters was Foremost Industries of Calgary  
26 who have world-wide experience in the development of  
27 terrain vehicles and particularly those for use in  
28 northern climates. All of these vehicles shown here  
29 are standard production units which already exist and  
30 have been proven by thousands of hours of use under



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1 climatic and terrain conditions similar to what we would  
2 experience on the Arctic Gas project.

3 Q So, when you speak of  
4 final design, you're really speaking only of the shelter  
5 attachment that goes on the track vehicle which is a  
6 production unit?

7 A Yes, Mr. Marshall, there  
8 is nothing in any of this design that is new. It is  
9 simply a matter of pulling together in a configuration  
10 to suit our purposes and a number of things which are  
11 already established and proven in other activities.  
12 The van that you see mounted on the vehicle is simply  
13 a standard van that would be insulated and it would  
14 enclose the machinery and equipment required for the  
15 operations that would be carried out under the shelter  
16 area; welding machines, generators, air compressors if  
17 necessary, depending on the operation, would be  
18 carried out.

19 The design of the cantilevered  
20 portion, the structural part of the shelter itself  
21 is pretty simple and straightforward. It has high  
22 beams in it to support certain hoists, if necessary,  
23 in the operation. It has built-in heating units that  
24 can be used if needed and run by a generator inside  
25 the van. It has lights. As you'll note in the inset,  
26 it's also designed to have fabric sides which can be  
27 lowered in place on the most extreme days to provide  
28 the maximum shelter to people from the extreme cold  
29 weather conditions and the wind particularly.

30 Q Thank you, Mr. Daniels.





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1 Mr. Dau, as part of your answer to question number six,  
2 you referred to charts that were compiled from data  
3 in Appendix A. I understand that those charts were  
4 circulated the other day by Mr. Steeves, and I think  
5 they ought to be marked as an exhibit because I have  
6 some questions for Mr. Dau on them. Do you have those  
7 charts in front of you, Mr. Dau?

8  
9 WITNESS DAU: Yes, sir.  
10  
11  
12  
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In Chief

1 Q It's a set of  
2 three charts, one for Inuvik, the other for Komakuk  
3 Beach, and the third for Shingle Point, all for the  
4 winter of 1974-75, is that correct?

5 WITNESS DAU: Yes sir.

6 Q Can we mark that as  
7 Exhibit 855? Mr. Dau, could you take us through  
8 these terms, please, and tell us how they were put  
9 together and what they tell us?

10 A Fine, Mr. Marshall.  
11 The charts are developed from weather data that's  
12 include in Appendix "A" of my testimony, and that's  
13 this document that has weather data for Inuvik,  
14 Tuktoyaktuk, Shingle Point, and Komakuk Beach. If I  
15 can first refer to the Inuvik chart --

16 Q Just perhaps before we  
17 go on there, Mr. Dau, you left with me, and I forgot  
18 to mention it at the time of filing the document, there  
19 was one page left out of Appendix "A".

20 A That's correct, sir.

21 Q And perhaps we could  
22 -- that was Exhibit 849, sir, it's marked 849-S or  
23 something. I'll pass out this page.

24 A Refer to the Inuvik  
25 chart, Mr. Commissioner. This chart plots first the  
26 left-hand vertical axis is numbered in working days,  
27 the horizontal lower axis is calendar time in days.  
28 The plot on the chart relates to the number of days  
29 with a wind chill of 45 degrees Fahrenheit, that's  
30 equivalent wind chill, or less. The horizontal



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1 portions of the chart represent days that had a wind  
2 chill below 45 degrees Fahrenheit, or in one instance  
3 where we've shown a 10-day Christmas break over the  
4 Christmas season.

5 THE COMMISSIONER: That  
6 flattening out, the loss of those days, the flattening  
7 out of the line represents where-- they weren't  
8 lost owing to the lower temperature and wind chill?

9 A Yes, in this illustration,  
10 and that's what I would like to call it, when there  
11 is a horizontal line rather than a line at a slope  
12 of 45 degrees, that means that on that particular  
13 day the equivalent wind chill was less than minus  
14 45 degrees, that's lower than 45 degrees, and there-  
15 fore the assumption is that we --

16 Q You mean colder?

17 A Colder, right, sir.  
18 O.K., therefore there was no work done.

19 THE COMMISSIONER: Yes.

20 MR. MARSHALL: Q In short,  
21 if you got in a working day you went up one notch  
22 on the left axis, vertical axis.

23 A That's correct.

24 Q If you didn't work that  
25 day --

26 THE COMMISSIONER: That's  
27 arbitrarily dumping the ten days at Christmas.

28 A No, the Christmas break  
29 is arbitrary, sir.

30 Q O.K., that's what I





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1 thought.

2 A Yes.

3 MR. MARSHALL: That's been  
4 imposed from above.

5 A Yes.

6 THE COMMISSIONER: Yes, go  
7 ahead. Sorry.

8 A If I could start, and  
9 you mentioned it earlier today, sir, with respect to  
10 when one could start operations at any particular  
11 location, as you said, Mr. Williams had discussed  
12 this at some length in these proceedings, and he has.  
13 I believe Volume 74 of the transcript contains a good  
14 part of that discussion where references are made to  
15 the muskeg research report and winter road transpor-  
16 tation and commencement on the Mackenzie Delta.  
17 There's a reference to a report of the Environmental  
18 Protection Board, I believe it's impact assessment  
19 Volume 4. There is also some evidence of Mr. Longlitz  
20 from the Land Use Department regarding startup times  
21 in the delta area. There's a reference to the  
22 Inuvik snow road test that's conducted by Northern  
23 Engineering in Inuvik in '73-74. There are other  
24 references to a U.S. Corps of Engineers Manual, and  
25 Department of Transportation records at Inuvik and  
26 other locations.

27 We have concluded from all of  
28 that data that Mr. Williams discussed that it would be  
29 possible to start the construction of snow roads when  
30 330 freezing degree days had occurred, and on this



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1 particular chart in the upper left-hand corner you  
2 will find a range of time in which that 330 freezing  
3 degree days occurred during the record years of 1970  
4 to 1975. They are also found in Exhibit "A".

5                   On the second page under the  
6 Inuvik section, it lists by calendar day the accumula-  
7 ted freezing degree days and the data to show that  
8 range is taken from those tables.

9                   We have also concluded that  
10 it would be possible to start heavy utilization of  
11 those snow roads ~~when~~ 550 freezing degree days had been  
12 accumulated. That data is also shown in Exhibit "A"  
13 and the range on that Inuvik chart for the years 1970  
14 and '75 is shown.

15                   We have also concluded that  
16 it would be necessary to shut down operation of  
17 snow roads when an accumulation of ten fine degree  
18 days had occurred, and in the lower right-hand corner  
19 of the chart you will find the range of time that  
20 that occurred. That also is listed in Exhibit "A".

21                   Now, sir, if I could go  
22 back to the graph that we have drawn. We rather  
23 arbitrarily selected the winter of 1974-75 to use  
24 as an illustration because by a general inspection  
25 it appeared that it was one of the colder or one of  
26 the coldest winters on record and had a significant  
27 number of days with very cold equivalent wind chills.  
28 On that -- in that particular year in Inuvik, 550  
29 freezing degree days occurred <sup>from</sup> October 20th and this  
30 says that heavy operations on the snow road or snow



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1 pad would commence on that day, and every day could  
2 be worked to sometime in September -- I'm sorry,  
3 December, at which time there was a day that had  
4 equivalent wind temperature -- wind chill temperature  
5 of colder than minus 45, and that can be found, sir,  
6 in Exhibit "A" for December of 1974. We never seem to  
7 have page numbers on these things, sir. It happened  
8 to be December 20th, and that day the equivalent  
9 wind chill temperature was 45.9 degrees.

10 We went through the equivalent  
11 wind chill days for the remainder of the year and  
12 allowing for the 10-day Christmas break, by the time  
13 of the first ten fine degree days we accumulated 172  
14 working days in the Inuvik area.



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1 We have also shown for illus-  
2 trations the calendar time and work day time that is  
3 assumed in our cost estimate for the construction  
4 spread that works in the Inuvik area. For cost purposes  
5 that spread is assumed to have worked 102 days to  
6 complete their assignment. That date on this illustra-  
7 tion would be in late February. When 102 work days  
8 had been completed, 129 calendar days would have elapsed,  
9 and I want to stress sir, that this being very specific  
10 we have picked the winter of 1974, 1975.

11 We're also showing very arbi-  
12 trary additional 15 days to illustrate that all opera-  
13 tions do not start on day 1 but they are staggered.  
14 The additional 15 days since we're in an area where  
15 we -- it's relatively warm in relation to the minus  
16 45 wind chill, the calendar days and the work days  
17 each increase by 15 days. We have 117 work days and  
18 144 calendar days. On those following that through,  
19 on those assumptions, there is a remaining 53 calendar  
20 days that are potentially available for working. Out  
21 of that 53 calendar days, obviously would have to come  
22 any shut down for other weather factors which can occur.  
23 A day where the temperature is warmer than minus 45  
24 wind chill but it has a very high wind with blowing  
25 snow and visibility would shut down a spread. Any  
26 problems that resulted from not being able to start  
27 on precisely the right day, because of movement of  
28 camps, or erection of camps or something like that,  
29 and I want to stress that this is an illustration and  
30 shows there are additional days available. The next





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1 chart, Inuvik incidentally is based on minus 45 wind  
2 chill is a pretty good place to work. If you turn  
3 over the page sir, the next one is for Shingle Point  
4 and you can compare the two and you can see that at  
5 Shingle Point, there are more shut down days because  
6 of weather, as you would expect on the coast.

7 At Shingle Point, there happens  
8 to be 92 calendar days left.

9 The third one, which is at  
10 Komakuk illustrates some of the extreme conditions and  
11 as you can see there are many days that are shut down  
12 because of extreme temperatures.

13 THE COMMISSIONER: You have  
14 more days left over at Komakuk and Shingle Point  
15 because the program for the spread is less ambitious  
16 than at Inuvik, is that it?

17 A That is correct sir.  
18 It's 92 days rather than 102.

19 MR. MARSHALL: Excuse me Mr.  
20 Dau on that point. Is it that the program is less  
21 ambitious or that you have an earlier freeze and a  
22 later thaw at those other locations?

23 A Mr. Marshall this illus-  
24 tration is based on the time that we think is necessary  
25 to complete that assignment. Shingle Point crews  
26 require some additional time at the beginning of the  
27 year to get camp in operation and I've not shown that.  
28 I'm only trying to illustrate that the -- if I can go  
29 to Shingle Point, the 92 work days or if you -- the  
30 107, work days with the 15 days staggered, leaves us 92



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1 calendar days to accomplish those other items, and as  
2 I said Komakuk is the worst one with respect to weather  
3 and there are 65 calendar days remaining. I don't  
4 want to -- I hope I don't confuse the wind chill prob-  
5 lem any more Mr. Commissioner but there's -- most  
6 authorities use a basic simple equation and that's a  
7 gentleman's name, spelled S-I-P-L-E for determination  
8 of equivalent wind chill temperatures. Of that equation  
9 is published a document by the meteorological branch  
10 of the Department of Transport, it's I believe, also  
11 published in a document Environment Canada on the  
12 climate of Mackenzie Valley, these are public documents.  
13 Those two documents have slightly different ways of  
14 dealing with wind chill. My understanding what Foot-  
15 hills have used is that they are using a national  
16 oceanic and atmospheric administration reports by the  
17 U.S. Department of Commerce and that particular document,  
18 wind speeds and ambient temperatures are added together  
19 when the wind speed is less than five miles an hour  
20 to record a wind chill at very low wind speeds.

21 THE COMMISSIONER: Excuse me,  
22 Mr. Dau, I'm don't -- I'm not quite with you there.  
23 The sheet that Mr. Kosten was taxed with seemed to me  
24 this one where the curve was drawn, this one is entitled  
25 cooling power of wind expressed as equivalent chill  
26 temperature. You say this comes from these records  
27 kept by the U.S. Department of Commerce. Now what is  
28 your criticism again of this, or your comment on it.

29 A I'm not criticizing it sir.  
30 I'm, trying to say that there are many ways of calculating



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1 the equivalent wind chill and unfortunately, in this  
2 proceeding everybodys not using the same way.

3 Q No. No. But you said  
4 something that didn't quite jive, that a very low wind --

5 A Yes sir. In that particular  
6 table, I believe if you find or I'm sorry, in the back-  
7 up that -- not that table -- the --

8 Q Oh you say that the value  
9 they give to the velocity is greater than it -- than  
10 you think it ought to be. That's how they get the --  
11 that's how they reach the wind chill thing sooner than  
12 you would, using the simple method, is that right?

13 A That's correct sir.  
14 That table will give you lower equivalent wind chill  
15 for a temperature and a wind than will the method that's  
16 used by the meteorological branch of the Department of  
17 Transport in Canada and the information that's in  
18 Exhibit A is based on the -- the Canadian method by  
19 the meteorological branch, so therefore if you go to  
20 a particular day on the tables that Foothills are using  
21 and compare the wind chill that they have, with the  
22 wind chill that's listed in Exhibit A, you will find  
23 a difference. Theirs will be lower.

24 Q Now have you -- it's not  
25 only the charts you're using but they took minus 35,  
26 you've taken minus 45, there's two factors from which  
27 you derive a much larger number of working days than  
28 they would?

29 A Yes sir, I'm not saying  
30 that we will shut down at 45, I'm using it as an illus-





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1       tration sir, if I could go to that now sir.

2                   Q       Right.

3                   MR. MARSHALL:   Excuse me Mr.

4       Dau, just before you leave the two charts, you indicate  
5       there's a difference, but, as I understand it, insofar  
6       as we're concerned, the difference is a pretty small one  
7       and we don't have to be concerned about that in these  
8       proceedings.



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1 THE COMMISSIONER: The  
2 difference between what?

3 MR. MARSHALL: The wind chill  
4 you would get off the Foothills chart as compared  
5 with what you'd get off Exhibit "A".

6 A No sir, they could be  
7 quite substantial.

8 Q It could?

9 A Yes sir.

10 Q In the order of what,  
11 sir?

12 A I'm sorry, we could  
13 check. I just don't know, it could be 10 or 15 degrees  
14 in the very extremes, I'm sure.

15 Q I see. O.K., fine.

16 A But that's really neither  
17 here nor there, because we both have to start with the  
18 same basis, which is a temperature and a wind.

19 THE COMMISSIONER: Well, for  
20 the man standing up there it feels the same no matter  
21 what chart you use.

22 A I think Mr. Williams  
23 also discussed here our approach to conditions under  
24 which work can proceed, and under the climate of the  
25 Mackenzie Valley by Environment Canada, via Mr. B.M.  
26 Burns, on page No. 189 it has a chart and that chart  
27 I'm sure is attached to the back of my evidence and  
28 I don't think it has a --

29 MR. MARSHALL: It's the last  
30 page, in Exhibit 848, sir.



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1 THE COMMISSIONER: Sorry,  
2 that's Appendix "A", did you say?

3 MR. MARSHALL: The very last  
4 page in the filed evidence of the panel.

5 A Yes sir.

6 THE COMMISSIONER: I just have  
7 these shelters on the very last page. Sorry. Wait  
8 a minute, here's an extra one. Got it.

9 A Fine, sir.

10 THE COMMISSIONER: O.K.

11 MR. HOLLINGWORTH: Could you  
12 direct me to that again?

13 A I'm sorry, it is marked  
14 Appendix "B". This lists wind speed, temperatures,  
15 and on the chart there are different comfort zones, I  
16 believe is what they're described as. 1, 2, 3  
17 through 7 on the right-hand side you will find a  
18 description of those comfort zones. It's our position  
19 that it's possible to do effective work into comfort  
20 zone 5, and comfort zone 5 is defined as unprotected,  
21 skin can freeze in one minute to direct exposure,  
22 multiple layers of clothing mandatory, adequate face  
23 protection becomes important, work and travel alone  
24 not advisable.

25 Now in a general way but not  
26 precisely, the limits of comfort zone 5 range from  
27 approximately minus 35 wind chill to minus 55 wind  
28 chill. That, sir, is why we arbitrarily selected 45  
29 as a wind chill factor.

30 THE COMMISSIONER: You said



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1 it extends from what?

2 A Approximately minus 35  
3 to minus 55, equivalent wind chill factor, and it's  
4 not a precise calculation.

5 Q Yes, just sorry, before  
6 you leave this chart, you've got the wind speed from  
7 the left and you've got the temperature across the  
8 bottom.

9 A Could I use that  
10 illustration, sir? If you take a 20-mile-an-hour wind  
11 speed --

12 Q Right.

13 A -- and go horizontally --

14 Q Yes.

15 A -- you enter comfort zone  
16 5 at probably minus two or three degrees, which is on  
17 the bottom.

18 Q Yes.

19 A And it extends to about  
20 minus 17.

21 Q Right.

22 A There is a range and  
23 I think that you will find that those are generally  
24 on the order of minus 35 to minus 55.

25 Q If we converted those  
26 we'd get minus 35 to minus 45, eh?

27 MR. MARSHALL: To minus 55, sir.

28 THE COMMISSIONER: Sorry, 55,  
29 and that's why you took 45.

30 A Yes sir, it's just





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1 arbitrarily selected.

2 Q Right.

3 A These other gentlemen  
4 will speak to what wind chill temperatures they have  
5 accomplished.

6 MR. MARSHALL: Mr. Dau,  
7 just before you go on with your explanation, this  
8 chart, the comfort classification chart figure 5.24,  
9 appears to be based on United States Air Force Goose  
10 Bay Air Base information. This is contained in a  
11 publication by Burns, is it, sir?

12 A Yes.

13 Q I don't believe that's  
14 on the record here, and perhaps you can identify the  
15 source and we could mark that.

16 A The document is entitled:  
17 "The Climate of the Mackenzie Valley,  
18 Beaufort Sea, Volume 1,"  
19 by D.M. Burns, and it's published by Environment  
20 Canada, Atmospheric Environment.

21 MR. MARSHALL: Sir, I'd like  
22 to have that marked as an exhibit, as that's the  
23 source from which the chart is being taken and I  
24 believe as well there are some explanatory notes  
25 elsewhere in the document as to how the chart has  
26 been used.

27 THE COMMISSIONER: Fine.

28 MR. MARSHALL: Do you have  
29 a clean copy, Mr. Dau, or should we undertake to  
30 file one?



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A You better undertake to file one, sir. As you probably recall, Foothills and ourselves exhausted the supply.

Q Yes, we caused a run on the book store in Ottawa for this, sir, and they sold out all two volumes in a matter of a few moments.

I'm sorry, Mr. Dau, could you carry on?

THE COMMISSIONER: Perhaps you could loan its copy to Alcan, I guess theirs wasn't needed, eh?

A Yes, I just have one more brief thing, Mr. Marshall.

MR. MARSHALL: Yes sir.

A That in the illustration that I'm using for Inuvik, for instance, in the winter of '74-75, it would not be appropriate to plan an operation that you could start on the exact moment at 550 freezing degrees day curve. You try to do that, you try to be ready, but there is a range obviously of when that does occur and I have gone through the calculations on the basis that if you had a winter like 1974-75 with respect to the amount of cold days and the amount of wind chill, and you also happen to have the latest recorded date for accumulating 550 freezing degree days, and also had the earliest date for accumulating ten fine degree days to see what would happen to that particular winter, then it results in a reduction of 16 days from the available



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1  
2 working days of 172, for Inuvik; 23 days reduction  
3 from 198 days, work days available at Shingle Point;  
4 and an 18-day reduction from the 172 days available  
5 at Komakuk. On that basis then the remaining calendar  
6 days with all of those conditions put into it, 39 at  
7 Inuvik, 62 at Shingle Point, and 47 at Komakuk.  
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Q Mr. Dau, just to summarize and put it in simple terms, what conclusions have you drawn from your analysis of the data that's contained in Exhibit A of your testimony and the three charts that have been prepared from them, marked as Exhibit 855?

A We have sufficient time, Mr. Marshall, to construct along the North Slope in the manner that we have described.

THE COMMISSIONER: Well, that's a relief.

MR. MARSHALL: We mentioned earlier, sir, that we would have some material relating to the Banister 710 ditcher and Mr. Johanson has brought some up. Perhaps we could have that marked as the next exhibit.

THE COMMISSIONER: Okay.

MR. MARSHALL: 857.

THE COMMISSIONER: Just before you carry on, Mr. Marshall, what is the program, Mr. Goudge? I take it that there'll be some questions for the panel. Were you going to carry on or were you going to come back tonight?

MR. GOUDGE: Both sir, if it suits you. Mr. Veale has a commitment that he would like to make around the dinner hour and he's prepared to cross-examine first. Mr. Veale, Mr. Hollingworth and I will each have some questions. Perhaps if it suits you, sir, we could have Mr. Veale complete his cross-examination before dinner. I take it the evidence



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1 in chief is virtually concluded.

2 THE COMMISSIONER: Is that  
3 right?

4 MR. MARSHALL: I think about  
5 ten or fifteen minutes, sir, and I'll be finished. To  
6 expedite things, I'm not going to argue with the panel  
7 about the existence of a 710 ditcher by Banister. I  
8 am not sure where this particular element of the  
9 evidence in chief is taking us. I certainly enjoy  
10 looking at photographs as much as anybody else.

11 THE COMMISSIONER: What I was  
12 getting at was that, leaving this ditcher aside, it's  
13 been a long day and I was wondering if we couldn't  
14 stop soon and take a break for an hour or so. Do you  
15 have to get a plane tonight?

16 MR. VEALE: Yes, I would have  
17 to leave here at approximately 7:20 to get to the  
18 airport.

19 THE COMMISSIONER: And these  
20 gentlemen, I take it, want to leave on the late plane  
21 tonight, do they? I'm happy to accommodate them.

22 MR. MARSHALL: Sir, we had  
23 really planned on being here through tomorrow as well.  
24 So, we're easy.

25 THE COMMISSIONER: Yes, I  
26 think all of us want to finish tonight but I might  
27 go on past the last plane and you might not leave until  
28 the morning, that's all.

29 MR. GOUDGE: I think that's  
30 been taken care of, sir. If we could come back this



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evening for I would think no more than a couple of hours.  
I think that if we could either break now and come back  
at 6:30 or presumably preferably continue now until  
Mr. Veale has completed and then break. We could get  
through it if that's possible, sir.

THE COMMISSIONER: Okay.

Well, what about--we're with this ditcher. So, let's  
carry on with it.

MR. MARSHALL: I'll have to  
cut things short. Mr. Johanson, would you briefly  
explain what the booklet shows.

WITNESS JOHANSON: The booklet  
shows the Banister model 710 ditcher which we designed  
and built several years ago. It's been used in many  
tests and it's also been used on forty-eight inch  
line and forty-two inch line. Forty-two inch was the  
Trans-Canada Pipeline and the forty-eight inch was  
the looping program of approximately seventy miles  
that we had for Interprovincial Pipelines.

So, it's been tested in the  
field and the specifications are listed in the first  
page.

Q Mr. Johanson, was this  
designed to be a "Arctic ditcher"? Is that the purpose?

A It was designed with the  
idea in mind that we wanted to build a prototype and  
make sure that it worked and if, in fact, we designed  
it strictly as an Arctic ditcher, in our thinking at  
that time it would have been at least one-third larger  
than this one. As you see, this one is now up to the



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1 total of 230,000 pounds.

2 Q As I understand it, this  
3 /through  
4 is designed to be moved the south on conventional  
5 vehicles and broken into components. Is that right?

6 A We purposely kept it  
7 at a weight which would allow us to move it anywhere  
8 in Canada.

9 THE COMMISSIONER: This is the  
10 710?

11 A Yes, it is, sir.

12 Q Well, you said before  
13 the Energy Board that a new generation ditching machine  
14 is being developed, the 812. So, a prototype has not  
15 yet been built, but the point you made was you were  
16 confident this machine would be able to do the job in  
17 the Arctic. Was that essentially the position?

18 A What I had meant to say  
19 was this particular ditcher in our estimation was  
20 simply be sized upwards and become the Arctic ditcher  
21 that's being described in some of our testimony.

22 Q That's all?  
23 It would be one-third larger?

24 A That, I think, is to be  
25 decided yet, but that was our thinking at the time when  
26 we built this one that through the Arctic it would have  
27 to be, I believe, the third largest.

28 Q Yes.

29 A We don't believe there is  
30 much in the way of any change necessary for the larger  
31 ditchers simply scaling up.





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1 Q In that evidence at the  
2 Energy Board, the--just to make sure I've got it. We've  
3 been at this twenty months and we only have four or  
4 five days to go, so we have a tendency to leap around  
5 a bit but Mr. Daniels said that the only people who  
6 performed what I would call--what you would call, sir,  
7 planned and organized winter construction on Alyeska  
8 using the term loosely was Arctic constructors on the  
9 northernmost section when they layed the fuel gas line  
10 eight and ten inches in diameter.

11 A I believe that was Mr.  
12 Daniels, sir.

13 Q Yes, it was Mr. Daniels.  
14 I'm sorry. Mr. Daniels. Forgive me. What I'm getting  
15 at is this, so that we understand each other, Arctic  
16 Gas wants to build this across the North Slope. Now,  
17 when you built the Prudhoe Bay line or when Alyeska  
18 Service Company or whatever it's called built it, it  
19 was only north of the Brooks Range, that had they built  
20 the pipeline in winter, they would have faced  
21 equivalent conditions to what Arctic Gas will face on  
22 the North Slope and across--well, let's just say the  
23 North Slope so we don't--

24 Now, the only people who are  
25 constructing pipelines in equivalent conditions on the  
26 Alyeska job were Arctic constructors on this  
27 northernmost section which was an eight or ten inch  
28 line. How long was that line?

29 WITNESS DANIELS: Mr.  
30 Commissioner, I think it was one hundred and sixty miles.



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Q Oh, I see.

A It runs from pump station  
number one to pump station number four and I believe  
that's approximately the mileage. That's very clear.



Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
In Chief

1  
2 Q Yes. Well, so that  
3 the argument with Foothills, apart from snow roads,  
4 which is, well, that's a vital part of the argument  
5 but is it true to say then that there's no pipeline  
6 construction program of the magnitude that Arctic  
7 Gas proposes along the North Slope going on in Arctic  
8 conditions, equivalent conditions, anywhere in the  
9 world? This would be a project that would be going  
10 on-- it would be a new project. Sorry, I'm not making  
11 myself very clear, but it hasn't been done before.  
12 Is that a fair statement?

13 A In that specific area,  
14 that's correct, yes sir.

15 Q Well, I don't mean in  
16 that specific area, but in equivalent climatic and  
17 terrain conditions, that's what I mean. Presumably  
18 they've built pipelines in Russia in similar latitudes  
19 and terrain, but no one seems to know whether they  
20 built them in winter or in summer, or whether they  
21 had trade unions to contend with, or what. So we're  
22 sort of putting that to one side for the moment.

23 But the only thing that  
24 happened in Alaska that could be regarded as comparable  
25 would be this 160 miles of 8 or 10-inch line by Arctic  
26 constructors.

27 A Well sir, we think that  
28 the work which has been performed, which bears the  
29 greatest similarity to the Arctic Gas project is the  
30 work performed at Prudhoe Bay in the gathering systems.





Johanson, Fowler, Walker  
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1  
2 It is not identical and it does not achieve similarity  
3 in some regards, and it is not a buried pipeline,  
4 but as far as climatic conditions and efficiency of  
5 people under severe climatic conditions, we feel that  
6 the experience gained by Banister and by Brown & Root  
7 and Huston Contracting Company installing those  
8 gathering systems gives us a better indication of  
9 what people can do and what equipment can do under  
10 climatic conditions that are quite similar to what  
11 we've experienced.

12 Q Well, somewhere in here  
13 -- let me just pursue that, and forgive me, Mr.  
14 Marshall, but I just want to make sure I don't forget  
15 about this when we adjourn. Somebody said at page  
16 11520, Mr. Daniels, I think it was you -- no, Mr.  
17 Johanson -- you might be able, Mr. Johanson, to sort  
18 of throw your mind back to the specifics of this,  
19 this is 11520, if you've got it.

20 WITNESS JOHANSON: Yes, I  
21 have it, sir.

22 Q You said about two-  
23 thirds of the way down the page, line 19:

24 "MR. JOHANSON: No, I don't recall that I  
25 have. I don't think it had a lot to do  
26 with winter pipeline construction as such.  
27 It is more of a factory type of operation."

28 A That -- I'm sorry, sir.

29 Q Go ahead.

30 A That reference, I



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1 believe, was to the double-jointing operation that  
2 we had going in Fairbanks and in Valdez, and these  
3 were under controlled conditions in a well-heated  
4 building.

THE COMMISSIONER:  
Yes, well all right.

5  
6 Fine, then. Well, sorry to interrupt. Carry on,  
7 Mr. Marshall.

8 MR. MARSHALL: Mr. Daniels,  
9 just with respect to Arctic constructors, I understand  
10 you have some familiarity with the work they were  
11 doing. Mr. Mirosh mentioned an article in his  
12 -- in the course of his cross-examination, the  
13 purpose being, I take it, to show that they ran into  
14 problems during the periods of cold and couldn't get  
15 the work done. Do you have some knowledge of that, sir?

16 WITNESS DANIELS: Yes, I do.  
17 The project manager on that Arctic constructors is  
18 one of my closest personal friends, and I've taken  
19 advantage of that friendship during the course of  
20 the activity on Alyeska, particularly since it was  
21 on the -- some of their activity was on the North  
22 Slope area, particularly since they built part of the  
23 fuel gas line during the wintertime to keep myself  
24 knowledgeable as to what occurred, and I would like  
25 to point out that the paragraph which Mr. Mirosh  
26 quoted from "Pipeline Industry", the August issue, 1976,  
27 contains several inaccuracies, according to my  
28 information, which is about as close to the source  
29 as you can get. First of all --

30 Q I take it those were put



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1 by Mr. Steeves to the witnesses when they were on  
2 the stand.

3 A Yes. In the first  
4 place, that particular paragraph which was read  
5 into evidence, I understand today, refers primarily  
6 to the 48-inch operation, and I would point out  
7 that Arctic constructors and Alyeska never planned  
8 to lay any 48-inch in the wintertime with the  
9 exception of a five-mile experimental section, North  
10 of Galbraith Lake which was installed.

11 The only other installation  
12 was the 8 and 10-inch fuel line, and I did find the  
13 mileage, it's 146 miles. So that the implication  
14 and this particular article, which I point out is  
15 not authored, it's written by a journalist, and not  
16 what I consider an expert in the pipeline industry;  
17 the implication in the first sentence of that that  
18 the severe weather conditions and the result of low  
19 productivity were what shut down the 48-inch operation  
20 is inaccurate. Alyeska never planned to lay 48-inch  
21 in the wintertime, and they shut down as planned in  
22 early December of 1975.

23 THE COMMISSIONER: Well, let  
24 me just pursue that for a moment, because I suppose  
25 I'm responsible for you gentlemen being here. Back  
26 in March I said at this hearing that I had  
27 read a speech by Frank P. Moolin, Jr., senior  
28 project manager or engineer or something on the  
29 Alaska Pipeline, and I think the Alaska company sent  
30 me this speech or something, because he said in the





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1 speech, "We shut down the project for two months  
2 this winter. The Arctic winter is too severe  
3 for our work force and equipment."

4 That's just two lines or two sentences, it's two lines  
5 too. Do any of you know Mr. Moolin? Can you explain  
6 that?

7 A Well, I know Mr. Moolin,  
8 and I'm not sure that I can explain it. Maybe I can  
9 shed some light on it. I have a great respect for  
10 Mr. Moolin, but with all due respect, Alyeska is the  
11 first pipeline project he's ever been on, and secondly,  
12 he's never worked on a winter construction project  
13 in his life, and his intention and his plan at the  
14 very beginning was not to try to work in the Arctic  
15 winter. I would point out that that condition was  
16 brought about primarily -- and this is borne out by  
17 a great deal of evidence from my friend in Arctic  
18 constructors, my friend who is president of Associated  
19 Green, which I was a vice-president for four years.  
20 They have never worked. Alyeska was built by Americans  
21 and most of them had not been north of the Mason-Dixon  
22 Line, let alone the 60th Parallel or been to Alaska.  
23 They had absolutely no background and no experience.

24 Q One or two of them got  
25 north of that line to come here.

26 A A couple of us saw the  
27 light, but they have not had the background and not  
28 had the understanding, and as those of us who have  
29 been transplanted have learned a great deal of the  
30 ability to work in the wintertime is the psychological





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1 factor, the understanding that it won't kill you if  
2 you're properly prepared and properly clothed and  
3 if you plan properly. I suggest, and I think Alyeska  
4 now agrees with this, that they never planned for  
5 that very reason because they didn't think that they  
6 could put the work forces together to work in wintertime  
7 conditions; and secondly, because of the permit  
8 conditions which they enjoyed, that is the opportunity  
9 to build a complete gravel pad, the entire length of  
10 the pipeline, they didn't need to work in the  
11 wintertime.  
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Johanson, Fowler, Rymes,  
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In Chief

1                   A     So that was a major  
2 difference and a major advantage which they enjoyed and  
3 they made the decision very early in the planning of  
4 the project, not to do that.

5                   Q     Well that's a vital  
6 difference. Well let's take -- let's suppose you had  
7 started off with the advantages that Alyeska had, that  
8 is the Government of Canada had said to you, you want  
9 to build a haul road from the Alaska border across the  
10 northern Yukon and across the Mackenzie Delta, that  
11 would have meant that you could have had a year round  
12 construction schedule, I suppose, environmental con-  
13 siderations to one side and you would have elected  
14 then I take it, to do as Alyeska did and not to work  
15 in the middle of winter, is that a -- that's what  
16 Alyeska did, do you think you would have elected to  
17 do that?

18                  A     Mr. Commissioner to my  
19 knowledge, a fully detailed study of those two methods  
20 on an equal basis other than that particular factor,  
21 has not been carried out. Mr. Dau may correct me.  
22 The initial studies that were made on pipelines from  
23 Prudhoe eastward, began as early as 1965 and continued  
24 on through the Mackenzie Valley Pipeline Research  
25 Limited Project which proposed to bring that crude oil  
26 from Prudhoe down along a route similar to Arctic Gas  
27 route to Edmonton and the gas pipeline project which  
28 was Mountain Pacific which proposed to follow a similar  
29 route from Prudhoe somewhat similar to that which Arctic  
30 Gas, also proposes. Those were all studied on the basis



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1 of primarily summer time or non winter construction  
2 but in each of those there was an alternate study of  
3 the desirability of working in the winter time. None  
4 of those were gone into in depth to the extent that  
5 these projects are presently in application have en-  
6 joyed, but the conclusion drawn at that time, was be-  
7 cause of normal practice and because of what the in-  
8 dustry was accustomed to, that they would proceed on  
9 the basis of summer time construction, if permitted to  
10 do that. But whether or not I could say, and I'm not  
11 prepared to say that, that all -- all factors being  
12 considered because we've not considered all factors  
13 to the best of my knowledge, that we would prefer summer  
14 time construction.

15 Q Right. And you say Mr.  
16 Moolin with all respect, is maybe going a little far  
17 to impress his audience at the hotel in New York  
18 about the severity of Arctic conditions.

19 A Well I spoke with the --  
20 as I said at some length and over a period of a number  
21 of months, of running telephone dialogue and also  
22 personal dialogue on my trips to Alaska with the project  
23 manager of Arctic Constructors, who happens to be an  
24 Edmontonian He's been transplanted the wrong way,  
25 he's now an American citizen, but, he grew up in cold  
26 weather and he's had a great deal of experience -- he  
27 was the original project manager on the Mackenzie  
28 Valley Gas -- Mackenzie Valley Pipeline Research Limited  
29 Study, the Crude Oil Project. I asked him the question  
30 in a personal discussion in Fairbanks, if this project





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1 his section which is the northern most section, starting  
2 at Pump Station 1 at Prudhoe had been properly planned  
3 for winter time construction, could you have constructed  
4 it under winter time conditions and he said, yes, without  
5 question, and I specifically said that to him on the  
6 night of February the 5th this year when I'd just come  
7 down from Galbraith Lake seeing his crews lay the 8 and  
8 10 inch line, 146 mile fuel line that they were laying,  
9 and I wasn't particularly impressed with their progress  
10 and asked him to explain it to me and he pointed out  
11 that the difficulty lay in the fact that they had not  
12 properly planned it and Alyeska had itself not properly  
13 planned to do it under winter conditions, not under-  
14 standing the circumstances and the problems involved.

15 Q Right.

16 A I would point out that  
17 despite some difficulty they did lay approximately  
18 half of that 8-10 inch fuel line last winter, starting  
19 on -- they started laying pipe on the 3rd day of Feb-  
20 ruary, and despite the fact that -- and I asked also  
21 the question, will climatic conditions -- I asked this  
22 at a later time -- after they had ceased operations,  
23 were climatic conditions responsible for your not  
24 completing the 146 miles of the 8 and 10 inch fuel gas  
25 line and he said, no, they had nothing to do with it.  
26 They ran into a rock situation in an area that they  
27 had not anticipated and were not permitted to do the  
28 usual pipeliner thing of blasting it out of there  
29 with overloading and they were required to stick very  
30 closely to the neat ditch configuration and did not



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1 find a method to do that and were therefore caught in  
2 the spring breakup which came about two weeks early  
3 that year or this year and therefore had to shut the  
4 operation down.

5 Despite all those difficulties  
6 and failure to complete and I think this is indicative  
7 of the fact that the winter time even to Alyeska doesn't  
8 hold any great mysteries. The remainder of that project  
9 which is approximately 70 miles is now scheduled and  
10 under contract with Houston Contracting Company, to be  
11 built starting this coming winter with operations an-  
12 ticipated starting January. Mr. Johanson of Banister  
13 was an unsuccessful bidder on that particular project.  
14 So with all due respect to Mr. Moolin again, I feel  
15 that they never did address in any depth at all, the  
16 possibility of winter time construction and I don't  
17 really feel that Mr. Moolin is an authority and qualified  
18 to speak at any -- in any great depth on the subject.

19 Q Well then the whole  
20 question of mid-winter, I'm talking about December and  
21 January, construction of a pipeline of this magnitude,  
22 a project of this magnitude, that that latitude in  
23 those -- in climate, in that climate and in that kind  
24 of terrain, it wasn't addressed until you people add-  
25 ressed?

26 A Certainly into detail,  
27 as I mentioned earlier. The other projects with which  
28 I was associated had looked at it as a possible alter-  
29 native, but did not study it in any depth.

30 MR. MARSHALL: I'll be a few



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1 minutes sir, if that's all right. You didn't wish to  
2 break.

3 THE COMMISSIONER: No, I guess  
4 we'd better try to accommodate you.

5 MR. MARSHALL: Q Gentlemen,  
6 we've heard considerable discussion with the Foothills  
7 panel that was on earlier today concerning a minus 35  
8 degree Fahrenheit wind chill equivalent cut-off for  
9 pipeline operations, and I would like to know whether  
10 in your collective opinion, that criteria is valid.  
11 Mr. Daniels, could you lead off please?

12 A Mr. Marshall I consider  
13 that position, that a minus 35 degrees wind chill  
14 equivalent temperature would be a cut-off point for  
15 operations on a pipeline construction job as being  
16 so conservative as to be unrealistic. That -- everyone  
17 does this, but, that's a minus 4 degrees Fahrenheit  
18 with a 15 mile an hour wind. I've laid pipe in Oklahoma  
19 that cold, and therefore I feel that that cut-off temp-  
20 erature is an unrealistic as a cut-off temperature.  
21 I would also point out that the equivalent chill temp-  
22 erature or the wind chill temperature as it's called  
23 frequently, is an unscientific term and it is often  
24 used to demonstrate circumstances that are beyond the  
25 reach of its scientific derivation and determination.  
26 It is an expression only of the combined effect ex-  
27 pressed in equivalent degrees of the ambient temperature  
28 and the wind velocity upon exposed human flesh. If  
29 the human flesh is not exposed, those tables are not  
30 valid. If you are removed from the wind velocity



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1 effect, those tables are no longer valid. If you're  
2 completely removed you revert to the ambient temperature,  
3 as the only scientific determination of point.  
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1 Q As in the shelter?

2 A As in shelters and as when  
3 you put the hood up on your parka to protect your  
4 exposed face from the wind velocity. You, to a degree,  
5 reduce the impact of the wind chill effect. The  
6 other factor, of course, that in some tables is  
7 mentioned but you never see it graphed is the time factor  
8 It's no danger to expose human flesh will occur until  
9 after a certain passage of time depending upon the  
10 point of which the curve follows.

11 So, that is not indicative  
12 of what happens to everything that is a resource in  
13 pipeline construction; steel, lubricants, neoprene  
14 seals and glass. It's only indicative of what happens  
15 to the exposed human flesh and, therefore, in my  
16 opinion, it's not valid to use that as a absolute  
17 factor to determine when you do and do not carry on  
18 pipeline construction operations.

19 Q Mr. Fowler, have you had  
20 experience with the use of a criteria similar to that  
21 that was testified to by Mr. Kosten on behalf of  
22 Foothills?

23 WITNESS FOWLER: Yes.

24 Q Could you tell us about  
25 that, sir. Perhaps you could get the mike there.

26 A BP Alaska, our client,  
27 from the fall of '69 till the spring of '74 held us  
28 to stopping the work in the minus thirty-five chill  
29 factor.

30 Q This was in work at



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
In Chief

1 Prudhoe Bay?

2 A Prudhoe Bay.

3 Q Yes.

4 A We had not started the  
5 work on the gathering system of the pipeline. We had  
6 carried on outside work. In the winter of '73, '74,  
7 we started the construction and built part of the 69  
8 KV power distribution system. We asked B. P. Alaska  
9 to release us and let us determine when the crews should  
10 not work. So, during the pipeline construction and  
11 the last two winters of construction on the completion  
12 of 69 KV power distribution system, we more or less  
13 let the men determine and we worked in chill factors  
14 of minus eighty, minus ninety and one day completed  
15 ten tie end welds on the thirty-four inch line in  
16 minus 120 chill factor and to shut the work down at  
17 a minus thirty-five chill factor, I think is ridiculous.

18 The last two winters we've  
19 been able to work at Imperial Oil productive work at  
20 chill factors way below that.

21 Q Well, did you have men  
22 or personnel working outdoors, out of sheltered areas  
23 under those conditions?

24 A We did. The survey crews  
25 that were staking in the location of the--support  
26 filing for the supports; the labourers that were moving  
27 the dirt back away from the holes that were drilled when  
28 auger bits were extracted from the drill holes;  
29 overland pipes, the crews and men picking up the pipe  
30 and lining up the pipes and -- and moving the line-



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up clamps ahead; setting skids and things of  
this nature, they were working outside.

The welders--all the equipment  
was equipped with cabs, heated cabs. The welders  
worked inside a shelter when it got down really cold  
or if there was very much wind.

Q Now, were these sophisticated  
sort of shelters something like what was described by  
Mr. Johanson or a simpler product?

A They were a simpler  
shelter. We took some plastic, some of them had clear  
plastic windows, plywood and angle irons and built  
shelters about eight foot wide, eight or ten feet long,  
and they were more or less the set on type shelters.  
They were not--I've seen the drawings that Arctic Gas  
has and they were not near as sophisticated as that.  
They're very crude shelters.

Q What about working during  
hours when it was not naturally light?

A Well, the shelters had  
lights inside and also we had flood lights mounted on  
them, a little two week trailer with a generator that  
you could pull behind a pick-up and this lit up the  
area when we were carrying on a drilling operations as  
well as the pipeline operations during the dark periods  
and even at night. Sometimes we double shifted some  
of the crews and the area was lit up very well.

THE COMMISSIONER: How large  
was the crew?

A The crews varied. The





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1 field crews run around forty men. The welding crews  
2 run around sixty; sixty, seventy men. It varies.

3 MR. MARSHALL: I think, sir,  
4 there are tables attached to Mr. Fowler's prepared  
5 evidence that sets out the composition of the crews.

6 A Yes, that was the crew  
7 that was working on the thirty-four and thirty-eight  
8 inch line. There was about sixty some men.

9 Q Mr. Fowler, you testified  
10 that the crews worked and workers worked out of doors  
11 without shelters, they were outside workers and the  
12 conditions where you had wind chill equivalents of  
13 minus eighty, minus ninety and in one case, minus  
14 one hundred and twenty degrees Fahrenheit wind chill  
15 equivalent. Did you find that when you dropped below  
16 minus thirty-five degrees Fahrenheit wind chill  
17 equivalent, you lost fifty percent of your productivity?

18 A No. The men outside  
19 had a warm-up shelter. It was moved along with the  
20 crews and then when it was extremely cold, they would  
21 be outside maybe for fifteen, twenty minutes, or I  
22 don't know. Some of them might have stayed out longer  
23 than that but they'd stay out a short time and then  
24 they'd go in the warm-up shelter and there was hot  
25 coffee in there and they may stay in there five minutes  
26 or ten minutes. There was breaks in the work where  
27 they could do this. We did have a few extra labourers  
28 and helpers to spell them all and a lot of the men,  
29 when it got extremely cold, wore a ski mask, like the  
30 skiers have been wearing a long time and I don't know



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1 how cold the chill factor was but I lived forty miles  
2 from Aspen, Colorado which is a very large ski resort  
3 in Colorado for four winters and in January the skiers  
4 are up there zipping down the mountain at forty, fifty  
5 miles an hour and I know that the temperatures were--  
6 one morning where I live it was thirty-six below  
7 zero and yet the skiers were in Aspen skiing.

8 Q You mentioned something  
9 that interested me, Mr. Fowler. You said you left it  
10 up to the men to decide when they would go to work.  
11 Could you just elaborate on that a bit? This was  
12 with respect to the arbitrary standard of a minus  
13 thirty-five wind chill cut-off for outside work. You  
14 said you decided to leave it up to the men to decide.

15 A We found that during  
16 the winter of '73, '74 on the pipeline that the men  
17 would gripe about having to stay in the camp. They said  
18 they'd rather be out working. Some days they actually  
19 did on the 69KV powerline go out and work with chill  
20 factors below minus thirty-five when we could get by  
21 with it without B. P. Alaska knowing. So, the next  
22 winter, we let the men--and we found most men, they  
23 want to work. They want to get the job done. Most  
24 of them, even when it was really bad and cold and they  
25 may stay in the camp for a short time and then they'd  
26 say well, let's go get the work done. And a bunch of  
27 them they'd go back out and work.

28 As you can see here in  
29 Appendix C,  
30



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1  
2 In my testimony, we lost  
3 very few days during the winter of '74-75, and '75-76  
4 due to the cold weather. We lost more days due to  
5 blowing snow, is what we called a white-out.

6 Q Thank you, Mr. Fowler.  
7 Mr. Johanson, in the work that Banister was doing in the  
8 North Slope of Alaska at Prudhoe Bay, and based on  
9 that experience, would you comment on the suggested  
10 minus 35 degrees Fahrenheit wind chill equivalent  
11 cutoff for outside work on pipeline operations?

12 WITNESS JOHANSON: Well, that  
13 may have been applicable several years ago, and I  
14 think at that time it was basically being controlled  
15 by the welders putting that kind of temperature in  
16 their specifications. In other words, there was a  
17 time when they wouldn't let you weld below 15 or 20  
18 below zero.

19 Q Did this relate to the  
20 metallurgical aspects of conducting welding at those  
21 temperatures?

22 A I assume so, and -- but  
23 with pre-heating and so on, they changed that and we  
24 can now weld at much greater temperatures.

25 As a matter of fact, we worked  
26 at Prudhoe Bay all last winter and welded starting  
27 in late November-early December, and outside of the  
28 Christmas shutdown we lost one day in total for the  
29 whole winter, and we on one particular day worked  
30 and, got good production at minus 110 Fahrenheit wind





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1  
2 chill.

3 Q Well, what's your  
4 opinion with respect to the validity or otherwise  
5 of the minus 35 wind chill equivalent cutoff for  
6 pipeline work?

7 A I think it's too low.

8 Q Mr. Rymes, with respect  
9 specifically to equipment that would be used in pipe-  
10 lining operations, can you comment on the validity  
11 or otherwise of the minus 35 Fahrenheit wind chill  
12 equivalent cutoff?

13 WITNESS RYMES: Yes, I can.  
14 Mr. Marshall, first of all I think it was Mr. Daniels  
15 pointed out, wind chill is the effect on exposed  
16 human flesh, and certainly has no bearing on exposed  
17 metal or what have you in terms of machinery. So I  
18 think you should be wary of relating anything that  
19 relates to wind chill to equipment itself.

20 Secondly, the specifications  
21 for cold weather operations in terms of equipment  
22 have advanced quite substantially over the last 25 or  
23 30 years. I have been associated with the land  
24 engineering people of the Department of National  
25 Defence for quite a while, in terms of equipment,  
26 specifications, and what-not, and at one time not  
27 too many years ago the ambient temperatures at which  
28 military equipment was to operate for Canadian Forces  
29 was minus 40 degrees Fahrenheit. That has since  
30 been changed to minus 60 degrees Fahrenheit, and I





Johanson, Fowler, Walker

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1  
2 might add along that same line, I don't recall this  
3 exactly, it was around 1971, I believe, but at one  
4 of the drilling sites in the Mackenzie Delta north of  
5 Tuktoyaktuk on a Sunday morning, I don't recall the  
6 date but on a Sunday morning the temperature was  
7 minus 62 degrees Fahrenheit with a wind of approxi-  
8 mately 10 miles an hour, and it was decided at that  
9 time by the men on location that the movement of  
10 drilling rigs and the movement of equipment would be  
11 curtailed for that one particular day.

12 On Monday morning it got  
13 to -- it warmed up to minus 55, and everybody went  
14 back to work.

15 Q Do I take it then from  
16 what you say that with respect to equipment rather  
17 than a minus 35 temperature limitation, you're looking  
18 more at a minus 60 Fahrenheit temperature limitation?

19 A Yes, I think, Mr.  
20 Marshall, that in effect in terms of engineering  
21 there is really no limit in terms of what equipment  
22 can operate at. I think we have indications of that  
23 in the space areas, in crivogenic temperatures for  
24 liquified natural gas and of that nature. But from  
25 an operating point of view and where equipment stands  
26 today, and the advances that have been made in the  
27 industry in terms of equipment, I would say that a  
28 minus 60 degree Fahrenheit point would be the point  
29 that you would begin to <sup>consider</sup> stopping that equipment for  
30 various reasons.



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Daniels, Rymes, Dau  
In Chief

1  
2 Q Mr. Walker, do you have  
3 anything to add to this discussion about the point at  
4 which wind chill should stop work?

5 WITNESS WALKER: Only that

6 I concur that it's far too conservative a level  
7 at which to stop the work, and I think of the hundreds  
8 of miles of pipeline that have been built in the  
9 wintertime in Southern Canada, much of the operations  
10 -- many of the operations have been carried out at  
11 equivalent temperatures lower than minus 35, and in  
12 our experience, all of that work was done without  
13 shelters.

14 Q Mr. Dau, do you have  
15 anything to add to that with respect to this point?

16 WITNESS DAU: No.

17 Q Finally, Mr. Commissioner,  
18 you will recall that Mr. Kosten was asked by Mr.  
19 Steeves if he could take a look at Exhibit 846 which  
20 was the temperature data for Tuktoyaktuk and Inuvik  
21 for a period of years, and indicate when he would  
22 not consider working. Over the break I asked Mr.  
23 Fowler and Mr. Johanson if they would look at the records  
24 for Tuktoyaktuk for January and February of the years  
25 that are shown on these -- in this exhibit. That's for  
26 the year '71 and '72, '73 and '74. I asked these gentle-  
27 men if they would make a notation of the days in which  
28 they would not work in pipeline operations, given  
29 wind chill conditions that would equate to those shown  
30 in Tuktoyaktuk for these dates contained on Exhibit 846.



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1  
2 Mr. Johanson has marked  
3 his with a blue pen, and Mr. Fowler with a red pen,  
4 so that the differences can be seen. The document  
5 speaks for itself, sir, but perhaps I could just have  
6 each of them go through it very quickly and indicate  
7 by months how many down days they would anticipate  
8 there would be, given temperature and climatological  
9 conditions that's depicted in this exhibit. Mr.  
10 Johanson?

11 WITNESS JOHANSON: I'm  
12 looking at these charts, and mind you, we did this  
13 very quickly, and keeping in mind that there are  
14 some shelters to be used, in January '72, the first  
15 one here, I marked two days that would probably  
16 be lost. January '71 I had two days that would probably  
17 be lost, and one day in question. The reason for  
18 the question was that the temperature is fairly  
19 warm, as a matter of fact it's two above zero, but  
20 there was a 32-mile-an-hour wind blowing and that  
21 could preclude you from working on a day like that.

22 The records for January,  
23 '73, I marked one day only that would be lost in our  
24 opinion, and I have not seen the remainder of these  
25 documents.  
26  
27  
28  
29  
30





Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
In Chief

1  
2 THE COMMISSIONER: What are  
3 you treating as the cutoff point?

4 A This is -- we are really  
5 taking into consideration the wind and its mostly  
6 on the days with high wind that we may shut down, I  
7 would think. We're not using any particular cutoff  
8 point, although minus 82 was one I marked. It was  
9 26 below Fahrenheit with a 25 mile an hour wind  
10 blowing, and the main reason for marking it was the  
11 25 mile an hour wind; 26 below by itself should not  
12 be a bother of any kind.

13 MR. MARSHALL: Mr. Johanson,  
14 you also checked the month of February for each of  
15 those years. That's the second sheet in each of the  
16 groups. Perhaps you could deal with that.

17 A Well, in '73 I didn't  
18 mark any days that we would lose. '71, there are  
19 no days marked that we lost. '74, I marked one day.  
20 There again basically because of high wind, and the  
21 only other one that I missed was in '72, and I  
22 possibly didn't see this one because I see one now  
23 and here is one day that I might have missed.

24 Q Those, then, would be  
25 the days on which you would anticipate that you would  
26 be able to get pipeline construction work done, given  
27 those wind chills.

28 A That's true, and mainly  
29 because of the very great possibility of blowing snow.  
30 Mr., Fowler, I asked you to look at the same data for



Johanson, Fowler, Walker  
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1  
2 Tuktoyaktuk. Could you go through that for the  
3 months of January and February for the years shown  
4 in the exhibit, and indicate which days, in your  
5 opinion, would be down days for pipelining operations?

6 WITNESS FOWLER: There's  
7 a crack here which you asked about, Mr. Chairman.  
8 I used a chill factor of minus 70 and a wind of 20.

9 THE COMMISSIONER: Either one?

10 A Yes sir. In January  
11 '71 I had two days lost and one questionable day.  
12 In February '71 I didn't mark any days that would  
13 be lost.

14 January '72 I marked two  
15 days that would be lost, and in February '72 one day,  
16 and one questionable day. The questionable days  
17 would be due to blowing snow.

18 January '73 I marked one  
19 day. February '73 there would not be any lost days.

20 January '74 I marked two  
21 days with three questionable days. In February of  
22 '74 I had two questionable days. They would probably  
23 be lost work days.

24 Q Well, you're saying  
25 the loss is negligible.

26 A Yes.

27 Q- No question about that.

28 A Yes.

29 MR. MARSHALL: Thank you, sir.

30 That completes the examination in chief. The panel is  
available for cross-examination.



Johanson, Fowler, Walker  
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(QUALIFICATIONS & EVIDENCE OF MESSES. JOHANSON,  
FOWLER, WALKER, DANIELS, RYMES & DAU MARKED  
EXHIBIT 848)  
(APPENDIX "A" TO TESTIMONY OF MR. DAU MARKED  
EXHIBIT 849)  
(TRANSCRIPT OF PROCEEDINGS, N.E.B., SEPTEMBER  
8, 9, 10, 1976 MARKED EXHIBIT 850)  
(SUMMARY SHEETS MARKED EXHIBIT 851)

MR. VEALE: Mr. Commissioner,  
I would just like to continue on perhaps until seven  
or so.

CROSS-EXAMINATION BY MR. VEALE:

Q Mr. Fowler or Mr.  
Johanson, it's my assumption that the evidence  
you've just given could all be irrelevant if the  
-- if white-out conditions existed or if ice fog  
conditions existed. Is that correct?

WITNESS JOHANSON: I indicated  
some days the only reason we marked them, that I  
marked them was because we thought we might not be  
able to see to get to work, because of the blowing  
snow.

Q But I'm talking now  
about the days that you said you would work, and my  
question is: White-out conditions and ice fog could  
in fact make the evidence you have just given  
irrelevant to the extent that you cannot work, regard-  
less of temperature and chill factors, you just can't



Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
Cross-Exam by Veale

1  
2 see with white-out and ice fog, is that correct?

3 WITNESS FOWLER: That's  
4 correct. When we have certain conditions of blowing  
5 snow, which we have experienced and we acknowledge  
6 these days are<sup>a</sup> limited number of days.

7 MR. MARSHALL: Mr. Veale,  
8 shows the number of down days and  
9 there is a table in Mr. Fowler's evidence which/  
10 specifies whether or not they were lost due to  
11 blowing snow or visibility problems, or due to cold  
12 temperature.

13 A Ice fog as such generally  
14 doesn't shut us down. It's not that dense and with  
15 the artificial light we could go to work. If you'll  
16 notice in my table, the days that the wind velocity  
17 was up, that is when we experienced the white-outs.

18 THE COMMISSIONER: This is  
19 just while we're at it, I've got these charts, the  
20 one that begins Appendix "C",

21 "Days construction affected by weather."

22 A Yes sir.

23 Q And --

24 A The right-hand column  
25 is the reason.

26 Q Yes.

27 A It's kind of hard to  
28 correlate also. If you're going to try to set a  
29 criteria --

30 Q Well, at minus 125 it  
says "too cold."





Johanson, Fowler, Walker  
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1 A Yes sir. That's a chill  
2 factor.

3 MR. MARSHALL: Mr. Fowler,  
4 you explained to me and perhaps you can just explain  
5 for the benefit of the Commissioner about the  
6 December 10th "too cold" notation as well.

7 A Well, that's just one  
8 of the days during before Christmas the men, they were  
9 getting anxious to go on rotation and go home and  
10 that may have been one of the days that we had limited  
11 production on that day. They could have gone out  
12 and worked part of the day, and the wind picked up  
13 or something like that, and the chill factor was  
14 higher later in the afternoon, or they may have gone  
15 out at ten o'clock or noon and tried to work the rest  
16 of the day. They got -- on December 10th, 1974 now  
17 -- on December 15th of '75 the chill factor was minus  
18 40 but the next day all the men or most of them, the  
19 welding crews were fixing to leave for the Christmas  
20 break and I kind of suspicion they wanted to have  
21 a little party the day before they were going to  
22 leave. That's probably why they decided it was too  
23 cold that day to go out and work, because the next  
24 day the welding, pipe welding crews left the slope.



Johanson, Fowler, Walker,  
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Cross-Exam by Veale

1 THE COMMISSIONER: Did you  
2 shut down for Christmas for how long?

3 A Some of the people get  
4 on the slope and work. Our problem was is the men  
5 beginning to worry if they're going to be able to go  
6 home for Christmas and if it was properly planned  
7 and you had chartered planes and they were assured that  
8 they were going to be leaving, I think that a ten or  
9 twelve day break at Christmas would be what you'd be  
10 faced with.

11 We experienced a longer break  
12 /work in our outside than this. We had men though that were  
13 working in the shop, certainly the men had agreed to  
14 stay up there, maintaining the equipment and bringing  
15 equipment back up in shape and also, carrying out some  
16 pipe fabrication work.

17 Q Excuse me.  
18 What I'm getting at is that--for instance, at the top  
19 of the page, December 10th - too cold; January 13th -  
20 too cold. There was a two or three week period in  
21 there somewhere, I take it, where the problem didn't  
22 arise. The men were all gone home for Christmas.  
23 You don't have any records for that sort of depth of  
24 winter period around Christmas. Am I getting through  
25 to you?

26 A Yes, sir. We had records.  
27 They're not here.

28 Q Oh, I know you have the  
29 records.

30 A What I was mainly concerned



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Veale

1 with was the effect of the weather on the work.

2 Q I know that, and I know  
3 that you're trying to tell me that had it been necessary  
4 to stay and work right through Christmas had the men  
5 been motivated to do so, you could still have worked  
6 and the figures might have come out more or less the  
7 same as they do for January and February. I mean,  
8 I suppose that's the position you'd take. I just want  
9 to know what sort of a holiday or shut-down you took  
10 at Christmas in '74 -'75 and '75 -'76. Was it two  
11 weeks or three weeks or what?

12 A The crews worked inside  
13 on pipe fabrication and equipment maintenance did  
14 not shut down. The outside crews--the drilling crews  
15 were down about twelve to fourteen days. The pipe  
16 welding crews that were working up there were down  
17 from fifteen to eighteen days.

18 Q Is that working days?

19 A Yes.

20 Q Working days.

21 A Calendar days.

22 Q Calendar days.

23 A Calendar days. You see,  
24 we worked seven days.

25 Q Of course.

26 A With the proper planning  
27 for the rotation of the men, you could probably get the  
28 break ten or twelve days, down to ten or twelve days.

29 Q Yes.

30 A I started to say that





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1 this next winter we'll have approximately a thousand  
2 men working on the North Slope on the B. P. Alaska  
3 work. We have the phase three of the central power plant  
4 to commission, to complete the commission and the  
5 production center number one and number two. These  
6 1,100 men that we have working on this part of the  
7 work, we plan to entice approximately 600 to 650 of  
8 them to work through the Christmas break.

9 I do not know how many men  
10 that's on the B. P. Alaska work this past winter that  
11 worked through the Christmas break but just offhand,  
12 I would say we had around four hundred or four hundred  
13 and fifty men that worked through the Christmas break  
14 on the 69KV powerline that we were working on, the  
15 phase two of the central power plant, the fuel gas  
16 plant number two, the nitrogen plant that we put in  
17 for purging the pipeline for piping in the production  
18 centers and on the production centers. There was that  
19 many men out of the thousand or so that we had on the  
20 slope working--stayed over and worked through the  
21 Christmas break.

22 The operations that we shut  
23 down and elected to shut down were the outside  
24 operations where the men were exposed to the weather.

25 Q Right. Okay. Sorry.  
26 Go ahead, Mr. Veale.

27 MR. VEALE: I have an  
28 information question for Mr. Walker. On page five of  
29 your evidence, question thirteen, you're talking about  
30 the average daily rate in terms of mileage. Now, are



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Daniels, Rymes, Dau  
Cross-Exam by Veale

1 all those rates in that question number thirteen or  
2 your answer thirteen, are they all welding rates?

3 WITNESS WALKER: Yes.

4 Q And do you, in the  
5 information that Mr. Marshall indicated that he had,  
6 that hadn't been filed as an exhibit, do you have the  
7 equivalent daily rates for actual pipelining and  
8 backfilling?

9 A I've got the data here  
10 sir for lowering in, coding and lowering in. I don't  
11 have it for backfilling.

12 Q Okay. Just speaking  
13 then about lowering in, and without going into great  
14 detail on the exhibit, is the productivity on a daily  
15 rate basis the same for lowering in as it is for  
16 welding?

17 A Yes, for a rather basic  
18 reason. You can't lower in past the welding. The  
19 lowering in has to stay behind the welding operation.  
20 Now, the lowering in could work on days that welding  
21 wasn't working to catch up if they got behind for  
22 some reason. But generally they appear to be about  
23 the same because of the fact that the welding rate  
24 actually controls lowering in.

25 Q I see. So, I take it  
26 then that it's no advantage to have a highly productive  
27 welding rate at all if you're lowering in and falling  
28 behind?

29 A Well, contrary sir, that  
30 most owners would get after a contractor to get more



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Veale

1 equipment on if his lowering in was falling behind. If  
2 that equipment was breaking down and he wasn't staying  
3 up with the welding, he would be--pressure would be  
4 put on him to get additional equipment and crews to  
5 keep it up.

6 Q Is it generally the  
7 case that lowering in and backfilling falls behind the  
8 welding rates?

9 A No, sir.

10 Q So, in other words, you  
11 just add more men and equipment to the lowering in  
12 and backfilling process?

13 A Well, I don't think you'd  
14 require more men. It would mean more equipment. If his  
15 equipment was breaking down because it wasn't in good  
16 shape, he would have to get in equipment to replace  
17 it, so as to keep up.

18 Q So, I take it then when  
19 you're talking about southern winter construction on  
20 the Trans-Canada pipeline say in northern Ontario,  
21 Lake Superior area, you didn't have any difficulty  
22 then with your pipe laying in and backfilling, keeping  
23 up with the welders?

24 A No, sir.

25  
26  
27  
28  
29  
30



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1 A No sir.

2 Q It's just a question of  
3 getting equipment in?

4 A That's right.

5 Q I take it on that particu  
6 lar line, that there's some proximity to the Trans-  
7 Canada Highway, is there?

8 A Yes, most of it is fairly  
9 close to a good highway, except for an 85 mile stretch  
10 that we refer to as the short cut north of Thunder Bay  
11 and that is many miles removed from any highway.

12 Q So, generally speaking,  
13 all the equipment supplying that took place, took place  
14 along the Trans Canada Highway?

15 A Yes.

16 Q Mr. Dau, I take it you're  
17 familiar with page 6 of Mr. Johanson's evidence. About  
18 halfway down the page, Mr. Johanson indicates that  
19 plans for maintaining the progress comfortably ahead  
20 of schedule received a momentary setback in November  
21 as last seasons barge Flotilla encountered abnormally  
22 severe ice conditions along the northern coast of  
23 Alaska. The result being that most of the material  
24 and supplies were diverted to southern Alaskan ports  
25 and brought up on the pipeline haul road.

26 WITNESS DAU: Yes sir.

27 Q Were you to encounter  
28 the same severe ice conditions on the north slope of  
29 the Yukon, what would you do?

30 MR.MARSHALL: Sorry Mr. Veale,





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1 ice conditions that would prevent transit around Point  
2 Barrow.

3 MR. VEALE: It could be -- it  
4 could be that or it could also be ice conditions hypo-  
5 thetically a storm blowing ice in or anything. In  
6 other words, your barges can't get to shore to offlift --

7 MR. MARSHALL: I think the  
8 plan is to supply pipe for that section by the Mackenzie  
9 route.

10 MR. VEALE: Yes, fair enough.

11 WITNESS DAU: Well, first we  
12 have checked all the records we can find and we're not  
13 aware of that condition ever occurring and it obviously  
14 has occurred for short periods of time, but you must  
15 remember that the movement of that material is staged  
16 over the full shipping season and the Majestic's Plan  
17 in my view has sufficient contingency time in it, to  
18 allow for some -- if you want some temporary shut down  
19 because of ice conditions.

20 Q Well I take it then Mr.  
21 Dau that you have no contingency plan for that sort  
22 of severe ice condition? I mean there is -- pardon?

23 A Sorry sir. For all  
24 summer long? You mean that we could just never get  
25 there by barge?

26 Q Well no, I'm not stating  
27 how long it would last, but I'm asking whether you  
28 have a contingency plan for the occurrence of such an  
29 ice condition?

30 A No, we have not developed



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1 such a plan because we do not think that it's a likely  
2 or any remote chance of it happening to shut us down  
3 for a full summer season sir.

4 Q And it doesn't concern  
5 you that if it were a two week period of shut down?

6 A No sir.

7 Q You feel that you would  
8 be able to get all your supplies in?

9 A For a two week -- with a  
10 two week shutdown? Yes sir.

11 Q If it did happen, what  
12 would you do? If it did happen that you couldn't get  
13 your supplies and equipment in by barge, because of  
14 severe ice conditions, what would you do, if you wanted  
15 that equipment there?

16 MR. MARSHALL: Are we dealing  
17 with the Yukon Coast here?

18 MR. VEALE: Yes we are.

19 A With the Yukon Coast,  
20 and there was one season that it was impossible to get  
21 our equipment and supplies into the Yukon Coast by  
22 barge, is that --

23 Q Not for the whole season,  
24 I'm just postulating that you would have difficulty  
25 getting the -- a certain amount of equipment and supplies  
26 in that you required.

27 A Well if there were some  
28 items that were transportable by air, we do have a  
29 6,000 foot landing strip at -- I'm sorry, I don't  
30 remember the station number sir, in the Yukon, that's



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1 capable of receiving Hercules in the extreme case that  
2 you suggest, or the only alternative that I can think  
3 of, is that it would have to, whatever that -- those  
4 items of equipment were, would have to wait until they  
5 could be moved during the winter. I'm having difficulty  
6 with your --

7 Q Well I realize you don't  
8 think it will happen, but I'm suggesting to you that  
9 it might in the same fashion that it happens to Mr.  
10 Johanson.

11 A I think those are entirely  
12 different circumstances sir.

13 Q Mr. Daniels, do you have  
14 that article entitled Arctic Constructors in your hand  
15 there?

16 WITNESS DANIELS: Yes.

17 Q I would like to pursue  
18 this particular issue and draw your attention to page  
19 62, and that is where the fuel gas pipeline from Pump  
20 Station number 1 to Pump Station number 4 is dealt  
21 with, and I take it now that you agree that is a dis-  
22 tance of 146 miles?

23 A Yes sir.

24 Q And it's also 8 inch and  
25 10 inch pipeline?

26 A Yes sir.

27 Q I didn't hear just for  
28 the record -- I didn't hear the name of the person  
29 that you were dealing with, with the Arctic Constructors  
30 Company.





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1 A His name is Fallow.

2 Q Fallow?

3 A F-A-L-L-O-W.

4 Q And he was the project  
5 manager?

6 A For Arctic Constructors.

7 Q I see. And it is your  
8 evidence that Arctic Constructors until this particular  
9 gas pipeline, fuel gas pipeline was constructed, had  
10 no Arctic Construction experience, is that right?

11 A Arctic Constructors has  
12 not, no sir. Arctic Constructors is a peculiar base  
13 as you'll notice on the title page of this article,  
14 it's made up of a -- of a joint venture consortium,  
15 Brown & Root. Mr. Fowler's company is one of those  
16 companies and of course he's giving you some background  
17 of his experience in the north slope.

18 Q Well just to make that  
19 clear, was this fuel gas pipeline from Pump Station 1  
20 to Pump Station 4, did that involve Brown & Root?

21 A Brown & Root is a member  
22 of the consortium but the sponsor is Williams Bros.

23 Q And they call themselves  
24 Arctic Constructors?

25 A The consortium is called  
26 Arctic Constructors.

27

28

29 Q I'm sorry?

30 A There are three others,



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1 Great Plains Construction, Peter ( ) & Sons, H. B.  
2 Zachary Company from San Antonio.

3 Q Well my question maybe  
4 Mr. Fowler knows the answer to this, was Brown & Root  
5 involved in that -- the construction of the gas pipe-  
6 line for Pump Station 1 to Pump Station 4?

7 WITNESS FOWLER: As a member  
8 of Arctic Constructors, we were. Some of the people  
9 that's with Arctic Constructors had worked in Alaska,  
10 have worked in Alaska. I was not involved in the  
11 construction. In February of '74 I transferred to the  
12 B. P. Alaska Project, prior to them I spent 18 months  
13 reviewing the Alyeska Pipeline design, engineering  
14 design for constructability.

15 Q But your company then  
16 sir, was involved in the construction of this particular  
17 fuel gasline.

18 A Yes sir.

19 Q Okay. Now I'm not sure  
20 which of you Mr. Fowler or Mr. Daniels to direct my  
21 questions to, but either one of you can answer.

22 The article indicates that  
23 a snow work pad was constructed to protect the tundra.  
24 How thick was that snow work pad and how was it con-  
25 structed?



1                                WITNESS DANIELS: That was  
2 constructed by gathering snow in some instances and  
3 in certain areas along the right-of-way and actually  
4 transporting snow that had been gathered to the  
5 work pad area and putting it in place. There was  
6 no particular sophistication in the installation of  
7 the work pad. It was essentially done placing by  
8 dozer and grading by motor grader. To the best of  
9 my knowledge there was no pulverizing and I'm not  
10 aware if any time was allowed for centering and that  
11 sort of thing.

12                              Q     I see, so you're stating  
13 that the methods that Arctic Gas would use on the  
14 Yukon North Slope may be more sophisticated.

15                              A     As the results of the  
16 Inuvik snow road test demonstrate, there is consider-  
17 ably more sophistication to the placing of a snow  
18 pad than what was done here.

19                              Q     Are you aware of the  
20 depth of the snow work pad?

21                              A     I saw it when I was  
22 there in February of this year, and it varied from  
23 probably a minimum of about eight inches to  
24 probably a maximum I saw was around two feet.  
25 That would be to take the level up and to provide  
26 a more level surface to work on.

27                              Q     And how do those thick-  
28 nesses compare with the thicknesses of the road that  
29 you propose to construct, snow roads that you propose  
30 to construct across the Yukon North Slope?

                            A     I'll stand to be



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1 corrected, Mr. Veale, but I think ours averages around  
2 two feet. It basically is thicker than -- and signi-  
3 ficantly thicker than that particular work pad was.  
4 Mr. Williams, who has testified here before, was with  
5 me on that trip and I remember that was one of his  
6 obser\_vations, that it was a rather thin pad.

7 Q O.K., now was it the  
8 intention of the consortium to construct the 146 miles  
9 during one winter construction period?

10 A Yes sir, that was the  
11 original objective.

12 Q Now are you aware of when  
13 the snow road was ready for use? I take it that the  
14 article indicates that welding began on November 15.  
15 Now would that be fair to say that that's when that  
16 snow work pad was ready to go?

17 A Yes sir, they had  
18 part of the snow pad in place at that time. I'm not  
19 completely familiar with how much.

20 Q And I take it that this  
21 particular project can be distinguished from the  
22 Yukon North Slope construction because of its  
23 proximity to the haul road.

24 A Well, it had the haul  
25 road nearby, yes.

26 Q It was nearby, so if  
27 you got into trouble with a piece of equipment you  
28 just rolled another one in.

29 A Yes, the access would  
30 be better because of the haul road.





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1  
2 Q Now, just looking at this  
3 article on the same page, page 62, it indicates that  
4 welding began on November 15, 1975, and continued  
5 until December 4, 1975. It states that:

6 "During that period nine miles was welded."  
7 Now, am I correct in saying that's half a mile of  
8 weld a day?

9 A Approximately, yes.

10 Q And that's not a  
11 very productive daily rate, I take it.

12 A No sir, it isn't.

13 Q Now, what are the  
14 reasons for that?

15 A Well, I would think  
16 there could be several. First of all, that is the  
17 beginning of a project, beginning of a construction  
18 activity, and that is usually your lowest productivity  
19 period until the people polish up their performance  
20 and begin to perform better. Secondly, I think it was  
21 to a degree a factor because they were trying to  
22 operate under winter construction conditions with  
23 people who had not operated under similar conditions  
24 before, and there was a big learning curve for those  
25 particular people.

26 Q Was it the men that  
27 were actually doing the welding that were doing the  
28 learning, is that --

29 A Those people were all  
30 from the lower 48.



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1 THE COMMISSIONER: What are  
2 you going to do here, say in the Northern Yukon and  
3 across the delta? The only experienced pipeline  
4 welders, then, in this kind of climate would be what,  
5 people that worked on that project with you, or  
6 people that have worked around Prudhoe Bay?

7 A No sir. Mr. Commissioner,  
8 I would point out that the Canadian pipeline construc-  
9 tion industry has a great many pipeline welders who  
10 have worked in wintertime conditions.

11 Q They've worked in  
12 winter --

13 A At very low temperatures.

14 Q They've worked in  
15 wintertime conditions but not in Arctic conditions.

16 A That's true, not in the  
17 conditions we would experience there, but as our  
18 filed evidence reports, we've had people welding at  
19 minus 35 ambient temperature.

20 THE COMMISSIONER:

21 Yes, I know that. Let's  
22 not go through that again.

23 MR. VEALE: Now moving  
24 further down that column on page 62, it indicates that

25 "Rock-saws and ditching machines continued  
26 operations until the week of December 14, 1975."

27 I take it they started on November 15, 1975, as well,  
28 and because of extreme cold causing breaking of  
29 ditcher teeth and mechanical difficulties, only 6.2  
30 miles of ditch were excavated in that period. Now,  
I haven't done the calculation there, but that's



Johanson, Fowler, Walker  
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1  
2 a daily productivity rate that is pretty incredibly  
3 bad, isn't it?

4 A Yes sir, and I think  
5 that can be easily explained. Those people who are  
6 familiar with that project and anyone who's been there  
7 to observe it, the rocksaw didn't work. They were  
8 inadequate for the job and the ditching machines  
9 which Arctic constructors employed were ditching  
10 machines which were brought straight out of  
11 Oklahoma and Texas, they were standard Barber-Green  
12 TA-77s with virtually no adaptation made for this  
13 kind of activity, and were not suited for the job  
14 and that largely explains the difficulty of the  
15 whole project.

16 Q Well, would it be  
17 fair to say, Mr. Daniels, that if the same problem--  
18 and I say if the same problem -- is run into going  
19 across the Yukon North Slope, you're going to have  
20 the same difficulty in terms of having your pipe-  
21 laying and ditching and backfilling men stay up with  
22 your pipe welding men.

23 A Mr. Veale, that's always  
24 a problem. I mean one of the objectives of a pipeline  
25 contractor is to achieve uniformity of progress among  
26 the various crews on a pipeline spread, and the  
27 guide crew is usually the pipe and the welding crews  
28 and you structure the other crews on your operation  
29 so that they can maintain approximately the same  
30 average progress over a period of time without





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1 hopefully falling too far behind and leaving too  
2 large a gap in the operations.

3 THE COMMISSIONER: Let me  
4 explain to you why this is important to me, and  
5 why it will be important to you, Mr. Daniels.

6 If you can't build this  
7 thing in one winter, that is the line across the  
8 North Slope, if you can't build it in one winter,  
9 and if we in Canada establish meaningful environmental  
10 safeguards, then you'll have to wait until the next  
11 winter to complete it because if the safeguards are  
12 meaningful and are enforced it will mean you can't  
13 get in there in the spring because of the caribou  
14 herd, and you can't come in in the summer or even  
15 in the fall because of the birds. So that if we do  
16 it in that way and that's the way in which your  
17 company is urged it be done, and your own environmen-  
18 tal experts have said, "Don't let those people in  
19 there when the caribou are in there and when the  
20 birds are in there."

21 Now, if you can't do it, if  
22 you, you know, if you repeat the experience of Arctic  
23 constructors, and I'm sure you won't but if anything  
24 that resembles that kind of failure occurs, then  
25 your Arctic Gas is going to be faced with going to  
26 the Government of Canada and saying, "Look, you've  
27 got to let us carry right on and we're going to have  
28 to build a haul road, and the whole environmental  
29 program will have to be ditched."

30 That's one alternative and



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1  
2 presumably the Government of Canada is going to say,  
3 "No."

4 Well, if that happens, then  
5 you're going to have to wait until the next winter  
6 to finish. That means your cash flow is going to be  
7 held up for perhaps 10 months or a year, and the cost  
8 of this thing could be an extra billion or two billion.  
9 Now, certainly by that stage both governments are  
10 committed and you pass it onto the consumer, and he  
11 can rant and rave but not much can be done about it.  
12 That's why this is important, important because at  
13 that stage if you can't do it, these poor old govern-  
14 ments are going to have to weigh the environmental  
15 thing against the cost thing.

16 Now either way you people  
17 get to build it because once it's half-built, no one  
18 can say, "Well, let's stop now."

19 I think they did that with  
20 a street or something in San Francisco, didn't they,  
21 or was that Toronto? I've forgotten.

22 Well, anyway, I'm sorry,  
23 Mr. Veale, I'm just trying to make sure we all under-  
24 stand why we're spending time on this.

25 MR. VEALE: Thank you, sir.  
26  
27  
28  
29  
30



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1 MR. VEALE: Thank you, sir.

2 THE COMMISSIONER: We all  
3 should be having our dinner.

4 WITNESS DANIELS: Mr.  
5 Commissioner, we seem to spend not just at hearings  
6 but at all sorts of meetings the majority of our time  
7 with that particular question and studies have been  
8 carried out about the cost impact of that possibility.  
9 We usually go about it in two ways. We try to explain  
10 and point out the contingency that's built into the  
11 total construction plan and; secondly, we have done  
12 studies which indicate what the dollar impact would  
13 be upon cost of service, of course, in the final  
14 analysis of a delay of one year.

15 WITNESS DAU: I think we've  
16 discussed this before, Mr. Commissioner.

17 THE COMMISSIONER: Have we?

18 A There are things that  
19 could be done, in my view, and likely circumstance  
20 your rates. The first thing, of course, is we will  
21 have had two winters of experience with equipment  
22 that's going to work in that similar environment. One,  
23 of course, from Richards Island coming down and then  
24 going on down the valley. In the event that the six  
25 spreads--

26 Q So, the program hasn't  
27 changed? The two years in the valley first and the  
28 third year over there?

29 A That is correct, sir.  
30 The six spreads that are planned to construct from



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1 Prudhoe Bay to the junction with the mainline across  
2 the delta at Tununuk Point. If we determined at that  
3 time that there was a chance that we could not construct  
4 it in the timeframe, the options that are available  
5 are to move one of the spreads from southern Canada  
6 in if I can the second summer after the second winter  
7 season. That spread is idle. It could move in to the  
8 Canadian section from the Alaska/Yukon border over to  
9 the junction with the mainline.

10 It's an idle spread. It's  
11 not planned. There's no plans to utilize it. The  
12 cost has been written off on the project. The costs  
13 in our estimates in 1975 dollars to move that spread  
14 in and have it work a full season is \$48,000,000.00.  
15 That leaves the Alaskan section. On the Alaskan  
16 section, it would then be necessary to mobilize a  
17 new spread. It would be mobilized from the southern  
18 U. S. states and would have to move through Alaska  
19 and mobilization would be very expensive obviously  
20 because it would probably be a truck move up the highways,  
21 railways, the highway system in Canada and the haul  
22 road into Prudhoe Bay.

23 That spread would cost quite  
24 a bit more and is estimated at \$70,000,000.00. So,  
25 at that moment in time, Arctic Gas would then be faced  
26 with the decision of the \$118,000,000.00 additional  
27 expenditure to guarantee completion.

28 The other side of the coin,  
29 and you're quite correct, would be your cash flow  
30 and interest during construction on a very substantial





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1 investment for an additional year that would be far  
2 in excess of the \$118,000,000.00. I'm sure, sir, I  
3 can't believe that it would happen. If it did, those  
4 are the options that are available. The addition of  
5 the spreads, of course, is a substantial reduction in  
6 the amount that each spread has to do in one season.  
7 We're doing four hundred and I've forgotten the  
8 number--four hundred and thirty or four hundred and  
9 seventy miles with fixed spreads. We would then do  
10 it with eight. I think the number has dropped from  
11 sixty some miles this season down to forty-five miles  
12 this season or something in that order.

13 MR. VFALE: Mr. Dau, if I  
14 may just pursue that; I suggest to you that there's  
15 one small difficulty with moving in those spreads and  
16 that is that the decision to move those spreads in  
17 must be taken in the previous winter, is that correct?

18 A That is absolutely  
19 correct, sir.

20 Q So, that if you're not  
21 aware or you make a bad judgment call in the previous  
22 winter, you just aren't going to have those spreads  
23 are you?

24 A I can't visualize that  
25 happening, sir. The reason I can't visualize that  
26 happening is the planning and the field engineering  
27 that will be conducted before any work is being done.  
28 There will be drilling programs. We have geophysical  
29 programs to identify areas of permafrost and thawed  
30 soils, of rock, different types of soils. The knowledge



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1 of the conditions is going to be known well in advance  
2 of when you have to make the decision, because the  
3 situation can occur that we go down the valley with  
4 frozen soils and suddenly go to the Arctic coast and  
5 it's all rock. That can't occur. We'll know that.

6 The only conditions that I  
7 can visualize would be weather conditions and we do  
8 have weather stations. We have historical records of  
9 weather.

10 WITNESS FOWLER: Could I ask  
11 a question? Couldn't the spread be moved over the  
12 Alcan Highway in the present haul road that goes to  
13 Prudhoe Bay?

14 WITNESS DAU: Yes.

15 THE COMMISSIONER: I think  
16 that's what I think he says.

17 MR. VEALE: There's no  
18 dispute there. Well, the difficulty I have with that,  
19 Mr. Dau, is that you're not doing a test site facility  
20 on the North Slope of the Yukon. You've chosen Inuvik.  
21 You've chosen Norman Wells. You've chosen Sans Sault  
22 and so on. But you haven't done one on the North  
23 Slope and I don't understand why you don't do one up  
24 there in the previous winter.

25 A I'm sorry. A test site  
26 facility of what--

27 Q Well, where you actually  
28 take your ditcher in, if it's a 710 or an 812, we  
29 don't know, but you take it in and you try it out.  
30 Then you would know in the previous run, wouldn't you?



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1                   A     I'm sorry, sir. I  
2 understand your problem now. The current testing  
3 that's going on with the 710 ditcher is going to be done  
4 at Norman Wells. The reason it's going to be done at  
5 Norman Wells is that it's one of the most handy places  
6 to do it.

7                   Q     It's cheaper to do it  
8 there, isn't it?

9                   A     That's right obviously.  
10 The plans that have not been formalized for a test  
11 of an 812 and I'm sure that we would not move an  
12 812 ditcher back to the same test site at Norman Wells  
13 to test it. We would try to find something that was  
14 more difficult than what we find at Norman Wells and  
15 that correlating the information from the Norman Wells  
16 test site with the 710 and any future test with an  
17 812 at some other location and I'm/saying that it would  
18 be the Yukon coast but at some location; with that  
19 information on soils and information on performance,  
20 they can be correlated to the soils information that's  
21 available by drilling programs along the Arctic coast.

22                  Q     Okay. Let's then deal  
23 with the contingency that you've dealt with in your  
24 evidence on page one and that's the case where you  
25 don't have your 812 available and you're going to  
26 require blasting. Now, in this same article that I've  
27 been discussing with Mr. Daniels, some problems were  
28 run into and I'll just quote from page 67.

29                  "The contract specifications do not allow the  
30 material excavated from the ditch to be used for





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1 backfill. It must be hauled to disposal sites  
2 and replace with select material. Progress was  
3 retarded by the greatly increased amounts of  
4 ditch spoil and backfill materials required to  
5 be handled as the result of the use of explosives,  
6 together with the extra work required to fit the  
7 layer of insulation boards that were required to  
8 be placed in the ditch. Thus, lowering in and  
9 backfill crews could not keep up with the ditching  
10 and welding crews."

11 Now, if the scenario that you  
12 are talking about here where you have to bring in an  
13 increase of fifty men per spread to do the blasting,  
14 if you run into similar conditions where the blasting  
15 is putting the material all over the place, it's  
16 not uniform, it's not just coming out nice and neat as  
17 you do with your ditcher, you're going to need a lot  
18 more than a fifty man extra contingent on each spread,  
19 aren't you?

20 WITNESS DANIELS: Mr. Veale,  
21 the estimate envisions a certain amount of drilling  
22 and blasting on all sections, particularly those  
23 sections between Prudhoe and Tununuk. So, it's not  
24 a question of having to bring in the capability from  
25 no capability because the capability is there. Those  
26 spreads, for example, have nine back hoes and the  
27 ditching crew in addition to the 812 ditcher. So, that  
28 capability does exist to a degree.

29 Now, if you go on from there  
30 and postulate a situation where you encountered a



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1 greater degree of blasting than what was anticipated,  
2 greater than that capability would take care of, then  
3 additional equipment, additional personnel might be  
4 in order.  
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1  
2 Q I was asking Mr. Dau the  
3 question because his evidence states that this blasting  
4 and double-shift ditching and so on would require an  
5 increase of approximately 50 men per spread. Now those  
6 men aren't there.

7 WITNESS DAU: No, they would  
8 have to be brought in. But I think we're mixing  
9 things up here. This is on the basis that the 812  
10 ditcher --

11 Q I agree.

12 A -- is not any better than  
13 a 710.

14 Q M-hm.

15 A I think I said that.

16 Q Or it isn't ready for  
17 some reason.

18 A Yes, and the 710 is  
19 capable of excavating trench for us now, not to the  
20 degree that we intend the 812 to be capable of  
21 excavating trench. But certainly the 710 can do it.  
22 It has less capability on depth, ten feet instead of  
23 12 feet. That requires more blasting. You would  
24 still use the same type of equipment, you will use  
25 trenching machines. I hope I didn't leave the  
26 impression --

27 Q No, I appreciate that.  
28 I think we're on the same wave length.

29 A All right.

30 Q But you stated that an



Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
Cross-Exam by Veale

1  
2 increase of approximately 50 men per spread is  
3 required to do this blasting process.

4 A Yes.

5 Q What I'm suggesting  
6 is  
7 to you/that on the basis of the article I've referred  
8 to you need more men to come in and do the backfilling.

9 A Yes, I have not read  
10 the article but from what you said, if in fact you  
11 had to remove all the material from the trench and  
12 dispose of it elsewhere, haul other material in, which  
13 I think is completely ridiculous, why then I agree  
14 with you you need more men, of course you do.

15 Q Mr. Daniels, when we  
16 were discussing this Arctic constructors fiasco, you  
17 indicated you went over there --

18 THE COMMISSIONER: Brown &  
19 Root takes no responsibility.

20 MR. VEALE: -- were you over  
21 there when the spring breakup came and the road  
22 snow pad began to melt and caused the ditch to  
23 fill up with water, and they had floating pipe?

24 WITNESS DANIELS: No sir,  
25 in  
26 I wasn't there but/one of my telephone conversations  
27 I was brought up to date on it shortly after it  
28 occurred.

29 Q And I take it when that  
30 happens, you can't go any further, can you?

A Depends on the circum-  
stances. You can always pump the water out of the ditch.





Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
Cross-Exam by Veale

1  
2 Q Well, yes, I'm saying  
3 you don't have a snow pad any more.

4 A Yes, when the snow pad  
5 disappears --

6 Q When the snow pad is  
7 gone, you're done for on the North Slope, aren't you?

8 A Yes.

9 Q And you've got a ditch  
10 full of water, so that if that occurs on the North  
11 Slope, that's it and you have to come in in another  
12 season.

13 A Well, of course this  
14 is part of what Mr. Dau presented earlier, was to  
15 show that whereas a certain number of calendar days  
16 cushion into the schedule, even assuming almost the  
17 worst conditions which you could very likely, accord-  
18 ing to statistical information, avoid that occurrence.

19 Q And of course, your  
20 assumption that all this sort of thing will not happen  
21 on the Yukon North Slope is because you will have  
22 a very superior quality snow road, eh?

23 A Yes, that's one of the  
24 reasons, and then of course the plan, I think, is a  
25 more carefully and will be a more carefully thought out  
26 and executed plan than this example we've been discussing,  
27 all due deference to my friend as project manager,  
28 that he admits it was an ad hoc operation. Those were  
29 his words. But he tends to blame Alyeska for that  
30 situation, but he admits that it was not carefully



Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
Cross-Exam by Veale

1  
2 planned and I think Alyeska even would agree that  
3 it wasn't.

4 Q And I also take it  
5 that with the snow road tests that have been conducted  
6 by Arctic Gas have not been tested with an 812  
7 ditcher.

8 A well, no, they haven't.  
9 They've been subjected to more severe tests. This is  
10 a common misconception that the bigger the piece of  
11 equipment, the more difficult it is on a working  
12 surface. That's not true. The most difficult piece  
13 of equipment on a working surface is a pickup truck  
14 with 35 pounds pressure in the tires. An 812 will have  
15 what, John, about 14 to 15 p.s.i.?

16 WITNESS RYMES: Yes.

17 WITNESS DANIELS: That's  
18 approximately the bearing pressure target that's in the  
19 design characteristics as it now stands.

20 Q You're saying that you  
21 simulated an 812 ditcher on the Inuvik snow road  
22 test, is that right?

23 A No, we did simulate  
24 but what we did was use equipment, trucks for  
25 example, which have a greater bearing pressure and  
26 a greater impact pressure and therefore more destructive  
27 results on a snow road surface than 594 side boom or  
28 and 812 ditcher or a 710 ditcher, will have.

29 Q But the real problem  
30 is with the pickup trucks?



Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
Cross-Exam by Veale

1  
2 A Adams with higher  
3 ground bearing pressure and particularly truck impact  
4 pressure are the ones which always destroy your road  
5 of any kind, or surface of any kind quicker than do  
6 the ones which spread the pressure over a greater  
7 area and therefore have a lower pressure.

8 The weight really has very  
9 little to do with it. It's the distribution of the  
10 weight on the track surface or the contact surface  
11 with the ground.

12 Q What about the situation  
13 where you have your pipe -- what about the situation  
14 where you're dealing with the side boom? I take it  
15 you're dealing with a completely different piece of  
16 equipment with a 48-inch line than you are with a  
17 36 or 38-inch line. Is that correct?

18 A Virtually it's the  
19 same tractor. The 594 is the largest side boom that  
20 is made, and it is occasionally used on 36-inch,  
21 although it's a little over-sized but -- and the  
22 583 which is the next size in caterpillar trains  
23 is the basic tractor on 36-inch work. So that the  
24 difference in those two machines is not that great  
25 and of course the 594 has been used a great deal.

26 Q The only difficulty, I  
27 take it, that you would have with the side boom is  
28 that it is being operated on the edge of the snow road  
29 that you have built, and if there is any deterioration  
30 to the edge of that road, that you will run into





Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
Cross-Exam by Veale

1  
2 problems in the pipelaying process.

3 A You'd have to build a  
4 snow road so that that situation was taken care of,  
5 but I would point out that the weight distribution  
6 of that tractor is distributed over the entire track  
7 surface, not just on the edge of the track.

8 Q Now, Mr. Dau, what  
9 will you do in a situation where you wish to do  
10 some blasting and were involved with a situation where  
11 caribou are wintering on the North Slope?

12 WITNESS DAU: I believe  
13 we discussed this at great length previously, Mr.  
14 Veale, and I'm trying to remember the exact response  
15 that was discussed by many people other than me, and  
16 wasn't it Dr. Banfield --

17 THE COMMISSIONER: It could  
18 be. I'm wondering about this, Mr. Veale, Arctic Gas  
19 says 5 to 10% of the herd winter on the North Slope  
20 but why tax Mr. Dau with this when he's not an  
21 expert on caribou?

22 MR. MARSHALL: It might help  
23 Mr. Veale if I told you what P.W.A. did today to  
24 scare the birds away from the Hay River Airport,  
25 they sent the fire truck up and down the runway before  
26 we took off.

27 MR. VEALE: Well, I'll leave  
28 on this note. When we were dealing with the National  
29 Energy Board in Whitehorse we asked the White Pass  
30 & Yukon manager what he was going to do about the



Johanson, Fowler, Walker  
Daniels, Rymes, Dau  
Cross-Exam by Veale

caribou problems on the Dempster Highway, and he  
stated that all the trucks were equipped with loud  
horns and strong brakes.

On that note I have no  
further questions.

THE COMMISSIONER: Are you  
coming back next week, Mr. Veale?

MR. VEALE: Yes, I'll be back  
Wednesday.

THE COMMISSIONER: Good.  
Well, let's adjourn for supper, eh?

MR. GOUDGE: Yes sir.

THE COMMISSIONER: And --

MR. GOUDGE: I hesitate to  
suggest this, sir, because it's been a long day  
already, but it would accommodate, I think, everyone  
except perhaps yourself and the Court reporters if  
we could return in an hour, if that's possible.

THE COMMISSIONER: O.K.  
Well, let's make it 8 to 8:15 and try to straggle in  
here by then.

(PHOTOGRAPHS, ENVIRONMENTAL WELDING BUILDING,  
MARKED EXHIBIT 852)

(15 PHOTOGRAPHS OF WORK SITE MARKED EXHIBIT 853)

(3 CHARTS, INUVIK, KOMAKUK BEACH & SHINGLE  
POINT, WINTER OF 1974-75 MARKED EXHIBIT 855)

("THE CLIMATE OF THE MACKENZIE VALLEY-BEAUFORT  
SEA" BY B.M. BURNS MARKED EXHIBIT 856)

(BANISTER MODEL 710 DITCHER BOOKLET MARKED EX. 857)

(PROCEEDINGS ADJOURNED TO 8:15 P.M.)

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Mackenzie Valley pipeline inquiry:

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October 7, 1976 Yellowknife

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Government  
Publications

MACKENZIE VALLEY PIPELINE INQUIRY

IN THE MATTER OF APPLICATIONS BY EACH OF

- (a) CANADIAN ARCTIC GAS PIPELINE LIMITED FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE YUKON TERRITORY AND THE NORTHWEST TERRITORIES, and
- (b) FOOTHILLS PIPE LINES LTD. FOR A RIGHT-OF-WAY THAT MIGHT BE GRANTED ACROSS CROWN LANDS WITHIN THE NORTHWEST TERRITORIES

FOR THE PURPOSE OF A PROPOSED MACKENZIE VALLEY PIPELINE

and

IN THE MATTER OF THE SOCIAL, ENVIRONMENTAL AND ECONOMIC IMPACT REGIONALLY OF THE CONSTRUCTION, OPERATION AND SUBSEQUENT ABANDONMENT OF THE ABOVE PROPOSED PIPELINE

(Before the Honourable Mr. Justice Berger, Commissioner)

Yellowknife, N.W.T.

October 7, 1976.

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PROCEEDINGS AT INQUIRY

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APPEARANCES:

Mr. Ian G. Scott, Q.C.,  
Mr. Stephen T. Goudge,  
Mr. Alick Ryder, and  
Mr. Ian Roland, for Mackenzie Valley Pipeline Inquiry;

Mr. Pierre Genest, Q.C.,  
Mr. Jack Marshall,  
Mr. Darryl Carter,  
Mr. J.T. Steeves, and for Canadian Arctic Gas Pipeline Limited;  
Mr. Gerry Ziskrout,

Mr. Reginald Gibbs, Q.C.,  
Mr. Alan Hollingworth,  
Mr. John W. Lutes, and for Foothills Pipe Lines Ltd.;  
Mr. Ian MacLachlan,  
Mr. Russell Anthony,  
Prof. Alastair Lucas and  
Mr. Garth Evans, for Canadian Arctic Resources Committee;

Mr. Glen W. Bell and  
Mr. Gerry Sutton, for Northwest Territories Indian Brotherhood, and Metis Association of the Northwest Territories;

Mr. John Bayly and  
Miss Lesley Lane, for Inuit Tapirisat of Canada, and The Committee for Original Peoples Entitlement;

Mr. Ron Veale and  
Mr. Allen Lueck, for The Council for the Yukon Indians;

Mr. Carson Templeton, for Environment Protection Board;

Mr. David H. Searle, Q.C. for Northwest Territories Chamber of Commerce;

Mr. Murray Sigler and  
Mr. David Reesor, for The Association of Municipalities;

Mr. John Ballem, Q.C., for Producer Companies (Imperial, Shell & Gulf);

Mrs. Joanne MacQuarrie, for Mental Health Association of the Northwest Territories.

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I N D E XPage

## WITNESSES FOR CANADIAN ARCTIC GAS PIPELINE LIMITED:

O. JOHANSON

O.W. FOWLER

R.D. WALKER

W.L. DANIELS

J.E. RYMES

Phil H. DAU

- Cross-Examination by Mr. Bayly 30681

- Cross-Examination by Mr. Hollingworth 30709



Dau, Johanson, Fowler  
Rymes, Walker Daniels  
Cross-Exam by Bayly

(PROCEEDINGS RESUMED PURSUANT TO ADJOURNMENT)

THE COMMISSIONER: O.K., shall we come to order?

MR. GOUDGE: Yes sir, we're prepared to resume, and I think Mr. Bayly of the Committee of Original People's Entitlement would be first to begin his cross-examination.

CROSS-EXAMINATION BY MR. BAYLY:

Q Now, Mr. Fowler, may I address some questions to you in particular, but to the panel in general so that if anybody else wants to respond to them, please feel free to do so.

You have told us both in the answers to the questions that your counsel has asked you and in the answers that you gave to Mr. Veale that despite the restrictions on working as they related to temperatures that were imposed upon you when you worked for, I think it's British Petroleum in Alaska, you found that you could work at much colder temperatures and with much more severe weather conditions than the allowable minimum. Is that correct?

WITNESS FOWLER: Yes sir.

Q And you've given some examples, and I don't really want to go into the temperature or the amount of wind or the amount of blowing snow that will stop a project, but I'd like to have you address yourself to a number of suggestions I have as to reasons why you shut down an Arctic





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1 pipelining operation because of either weather or  
2 weather in combination with darkness. The first one,  
3 and you mentioned this in your evidence in chief, is  
4 that at certain temperatures and with certain wind  
5 combinations, flesh freezes if it's exposed.

6 A That's correct.

7 Q You can overcome that  
8 by covering as much flesh as possible and change the  
9 temperature at which you would have to shut down by  
10 doing so.

11 A Yes sir.

12 Q Another reason for  
13 shutting down because of weather and darkness condi-  
14 tions or a combination of them is problems with  
15 visibility. It may be blowing snow, it may be ice  
16 fog in combination with blowing snow, and cold temper-  
17 atures but that is the visibility that may shut you  
18 down.

19 A Darkness is not a  
20 factor. Blowing snow is.

21 Q So that is a weather  
22 condition that would cause poor visibility that  
23 would make you have to shut down under some conditions.

24 A Yes sir.

25 THE COMMISSIONER: Why is  
26 darkness not a factor?

27 A We have floodlights  
28 that light up the area before you can carry on the  
29 work.

30 MR. BAYLY: Q Now, a third



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 one -- and you've mentioned this in your evidence  
3 as well -- is the attitude and morale of the men.  
4 You've stated there was one instance when they may  
5 have gone in to your recollection because it was  
6 getting close to change in shift time and they wanted  
7 to have a party. That, perhaps in combination  
8 with weather conditions, caused a shutdown.

9 A There's a bt of  
10 factors affect the morale and whether a man wants  
11 to work or not.

12 Q But this is one of the  
13 reasons that jobs on the Arctic North Slope have  
14 shut down. You gave us one instance of that.

15 A One day that that  
16 may have happened.

17 Q Yes, all right. You'll  
18 agree with me that on certain construction projects  
19 when the men aren't happy, though, they may use the  
20 weather as an excuse.

21 A That's correct.

22 Q So the attitude and the  
23 morale of the men is important, and you've said that  
24 when the men want to get the job done, they will work in  
25 very difficult conditions. So the attitude --

26 A That's correct.

27 Q -- the attitude and  
28 morale of the men may be a plus factor as well as a  
29 minus factor, depending on what it is.

30 A And morale is very



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 important.

3 Q Yes. Now, another  
4 reason for shutting down could be the workability of  
5 the various equipment, and you've told us that equip-  
6 ment that is being developed can work under colder  
7 and colder conditions. I assume there are some  
8 limits to that with certain pieces of equipment.

9 A Some of the man may not  
10 work because of equipment breakdowns, but we never  
11 shut the work down because of equipment.

12 Q All right. Now, is it  
13 not true that as this article which has been distri-  
14 buted suggests, if I can find it here,

15 "Rock saws,"  
16 this is the third page of this article called,  
17 "Arctic Constructors",  
18 "Rock saws and ditching machines continued  
19 operation until the week of December 14,  
20 1975. However, because of extreme cold  
21 causing breakage of ditcher teeth and  
22 mechanical difficulties, only ten kilometers  
23 of ditch were excavated in this period."

24 So if it doesn't shut you right down it may slow you  
25 down.

26 A That's right.

27 Q Breakage of equipment,  
28 and --

29 A But the equipment that  
30 they were trying at the lake was a lot more experimental



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 than the equipment that you could equip a pipeline  
3 spread with today.

4 Q You're telling me that  
5 equipment is improving.

6 A Considerably.

7 Q Right, so this is  
8 getting less of a problem than it used to be.

9 A Yes sir.

10 Q O.K., I think your  
11 colleague wanted to add something to that answer.

12 WITNESS RYMES: Yes, Mr.  
13 Bayly. Let me say a little something about that  
14 rock saw that you keep talking about.

15 Q Well, I only talked  
16 about it once, and perhaps you can tell me what it is.

17 A O.K. I'm sorry, sir,  
18 you're not familiar with what a rock saw is?

19 Q No.

20 A Well --

21 Q That's something Mr.  
22 Dau didn't tell us.

23 A -- I'm just going to  
24 try and find the section that you were quoting from.

25 Q There's no page number  
26 on mine. Oh, sorry.

27 A It's all right, I've  
28 got it here.

29 Q Page 62?

30 A Yes, basically a rock





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 saw is a pretty well-defined instrument for construc-  
3 tion purposes. It's not unlike a large circular  
4 saw that's mounted at either the back or front of the  
5 piece of equipment, and it's generally used for cutting  
6 through concrete or cutting through an asphalt strip  
7 or so, so that you could put a ditch across the highway.  
8 In effect what they did is they took a standard rock  
9 saw with standard normal cutting teeth that you would  
10 find anywhere in Southern Canada or Southern United  
11 States or in the United States, and they simply took  
12 that and put it up there and tried to cut permafrost  
13 with it, and that doesn't work. It simply doesn't  
14 work at all.

15 Q Let's not get bogged  
16 down on a single piece of equipment.

17 A But I just like to  
18 remind you, Mr. Bayly, that they took a piece of  
19 equipment that had not been programmed or designed  
20 or in any way, shape or form basically prepared for  
21 the Arctic and they tried to make it work in the  
22 Arctic. My experience over a good number of years,  
23 we've seen all kinds of that type of thing, and it  
24 simply doesn't work, and if you're suggesting that it  
25 affects productivity, you're absolutely right. It  
26 sure does.

27 Q Yes, and you can't get  
28 away from that entirely, I suggest to you, because  
29 if you're going to buy pickup trucks or caterpillar  
30 tractors for ordinary clearing purposes, they may be



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 adapted in some ways, but basically they may be  
3 pieces of equipment that are designed for the south  
4 and adapted to the north. Would you agree with me?

5 A Mr. Bayly, we prefer  
6 to use the word "Arcticized" rather than "adapted",  
7 and I think there's a fair difference.

8 Q I can't keep up with  
9 your jargon all the time, but I understand them to  
10 mean the same thing.

11 A Yes.

12 Q Yes. You would agree  
13 with me, though, that the general statement, I take  
14 it, that some equipment will break down.

15 A Mr. Bayly, I've been  
16 in the equipment business all my life and I can't  
17 think of any occasion where you wouldn't have a  
18 piece of equipment break down at some time or other.

19 Q And would you agree  
20 with me that severity of weather conditions may  
21 cause equipment to break down more frequently, or  
22 in different ways, from more temperate conditions?

23 A No sir, I don't agree  
24 with that. I simply don't agree with that.

25 Q It just doesn't happen,  
26 eh?

27 A Not if the equipment  
28 is defined and properly specified for that particular  
29 theatre route of operations, it's no more prone to  
30 breakdown in the Arctic than it would be under the



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 extremes of a very, very hot desert operation.

3 Q Yes. In other words,  
4 they have their particular problems, the various  
5 climates.

6 A Yes.

7 Q But the ARctic isn't  
8 without its own and without particular effects on  
9 equipment.

10 A It has its effects,  
11 sure, just as the desert does.

12 Q Engines are less likely  
13 to boil over than they are in the desert, but things  
14 may freeze up or get more brittle.

15 A Yes sir. I think if  
16 we use your term "to get more brittle" loosely, I  
17 think that's a fair statement.

18 Q Yes. Now, is there  
19 any truth in the fact that certain pipeline welding  
20 jobs had to shut down because of cold? I beg your  
21 pardon?

22 MR. MARSHALL: If it's a  
23 fact, it's true.

24 THE COMMISSIONER: It's  
25 getting late. No, Mr. Marshall and I are just being  
26 very pedantic. Is it true that -- I don't know  
27 what you said. Carry on.

28 MR. BAYLY: Is it a fact  
29 that --

30 THE COMMISSIONER: It's  
getting late. Just don't mind us.





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

MR. BAYLY: I'll start again,  
sir.

Q Is it true that welding  
operations shut down on the Alyeska line because of  
extremes in temperature, making it difficult to get  
the quality of weld that was desired or required?

WITNESS DANIELS: There is  
nothing in the welding code which limits quality of  
welding based on temperature.

Q I'm not suggesting that  
that is necessarily a fact, but you have to shut down  
because the air temperature is very low . What I'm  
asking is, did the Alyeska line shut down because it  
was difficult to achieve the welding quality they  
wanted under extreme temperatures?

A If they did, it's because  
they did not carry out the proper procedure to achieve  
the quality under those temperatures.

Q So one of the effects  
of not carrying procedures out properly under cold  
temperatures may be that you don't get the quality of  
welds that you want.

A That's true at all  
other temperatures, and all other weather conditions  
including wind, including heat, including a whole  
range of circumstances. The cold is only one  
factor and there's nothing in the welding codes which  
limits welding to a cold situation.

Q And what --



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 A It hasn't a cutoff  
3 temperature.

4 Q I understand, but what  
5 you have just told me is weather may have an effect on  
6 it if you don't carry out the proper procedures.

7 A If the proper procedure  
8 is not followed, it can have a negative effect because  
9 of weather because of other reasons.

10 Q Yes, all right.

11 WITNESS FOWLER: This is no  
12 problem. I'm familiar with the metals and the welding  
13 procedures of Alyeska.

14 Q Too bad the --

15 A In the Alyeska project  
16 we used a lot more sophisticated metals and welding  
17 procedures. We had no problem. Of course we were  
18 right on the Arctic, not on the North Slope.

19 Q Yes, you say that there  
20 were no problems. We do hear other people say that  
21 there were problems with the quality of welds and  
22 if that had nothing to do with the weather, well,  
23 that's fine. But I understand there were problems.  
24 you say that they may be related to improper proced-  
25 ures more than the weather. Is that correct?

26 THE COMMISSIONER: That was  
27 alleged failure to X-ray, wasn't it? I t had nothing  
28 to do with the weather, as I understand it.

29 WITNESS DANIELS: I don't know  
30 if you have a specific instance that you have in



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 mind or not, but the most publicized problem on  
3 Alyeska has yet to be demonstrated that it was a  
4 quality problem. The primary problem was a bookkeeping  
5 problem.

6 Q Yes, but what I'm saying  
7 is we surely don't have to go into that.

8 A Yes.

9 Q We don't have to go  
10 into that here. It's nothing to do with weather,  
11 climate, it just could have happened in Oklahoma,  
12 God forbid.

13 A If you failed to follow  
14 the procedure and don't meet the requirements of the  
15 procedure, you could produce a weld that doesn't meet  
16 the necessary qualifications.

17 MR. BAYLY: All right.

18 Q Well then, try to stick  
19 to the weather as much as possible and let's go to a  
20 fifth thing that may be affected by weather, and that  
21 may be project control. One assumes that this project  
22 is going to have a number of inspectors. If we have,  
23 Mr. Fowler, your situation where men could work on the  
24 job only say, 15 minutes or half an hour at a time  
25 without coming in to warm up, we must assume that  
26 the inspectors, being human, will suffer from the  
27 same problems of exposure. Would you agree with me  
28 there?

29 WITNESS FOWLER: That's  
30 correct.



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 Q Would you agree with  
3 me that it may well be that we'll require more inspec-  
4 tors so that one of them can be drinking coffee while  
5 the other is out on the job?

6 A Not necessarily. That's  
7 not necessary. The inspector doesn't have to be there  
8 every minute watching that job. They go drink coffee  
9 if they're sitting in Huston or Oklahoma.

10 Q Now, if one of the things  
11 that Arctic Gas is to be charged with -- I don't  
12 mean that in a criminal sense, so don't pop your  
13 head up quite that way, Mr. Daniels -- I mean be left  
14 with the responsibility of, at least partially, is  
15 the integrity of the environment, do you agree with  
16 me that as the weather becomes more severe it becomes  
17 more difficult to determine whether you are going  
18 through an area that may be sensitive, that the men  
19 may become less careful about the instructions that  
20 they have been given environmentally than they are  
21 under less extreme weather conditions?

22 A We did not experience  
23 this.

24 Q Mr. Daniels, have you  
25 ever experienced anything like that?

26 WITNESS DANIELS: My  
27 personal experience extends to what we've defined  
28 here as winter construction as contrasted with Arctic  
29 construction, and I don't believe I can draw that  
30 corollary between summer construction and winter





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 construction.

3 Q Now, I'm not --

4 A For example, TransCanada  
5 Pipelines in their winter activities, which are under  
6 more severe weather conditions than their summer  
7 construction activities, got just as good quality and  
8 as good a tension a quality as they did in summer.

9 Q Well, let's take an  
10 example then, you're going across the North Slope with  
11 your wheeled ditcher and the route is marked out for  
12 you and the people that went out to mark it missed  
13 a sand or gravel deposit that was a fox-denning  
14 site and your ditcher goes right through it. Presumably  
15 that's the end of that fox-denning site for fox-  
16 denning. That may be more difficult for them to  
17 spot if the weather is bad. Would you agree with me  
18 there, Mr. Fowler?

19 WITNESS FOWLER: That's  
20 possible.

21 Q Yes. I'm just saying  
22 that these are things that you have to consider in  
23 the severity of the weather, as well as flesh  
24 freezing. Another one of these may be that you need  
25 more men to do the same amount of work. If you have  
26 to have men warming up from time to time to do the  
27 same amount of work, you need more men to jump on  
28 their machines or to do whatever their task was to  
29 keep the job going. Would you agree with me there?

30 A There is not many days



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 like this that you're talking about.

3 Q All right, I'm not  
4 saying there are and I won't argue with you about  
5 that. I'm saying that if you want to keep up the  
6 rate on those days, and you want the men out there  
7 working, that you either slow down because men have  
8 to take the breaks because of the weather, or you  
9 add men.

10 A Well, the nature of  
11 the pipeline construction job, there's men that are  
12 -- their time is not -- they're not doing something  
13 every minute that they're on the job. The way the  
14 operations go, they have some slack time in between  
15 the times that they are performing their particular  
16 job. This you have to understand about how the work  
17 is carried forward.

18 Q All right.

19 A I think Mr. Johanson  
20 will agree with me on that.

21 Q Is what you're telling  
22 me then, Mr. Fowler, that the men come in on very  
23 cold days into the shelters rather than standing  
24 around outside, or do they come in off the job to  
25 warm up, interrupting their work? Or is it a  
26 combination of both?

27 A It's a combination of  
28 both. It's very seldom that they have to interrupt  
29 their work, say, to go warm.

30 Q O.K. Let me suggest



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 to you that another reason for shutting down in  
3 cold temperatures is that the worst -- sorry, in  
4 bad weather, let's call it that in general terms --  
5 is that as the weather deteriorates, the chances of  
6 accidents increases.

7 A That's correct.

8 Q And the ninth one,  
9 which may not be something that pipeliners are  
10 used to, but something that the applicant seems to  
11 be concerned with, among others, is that if you're  
12 going to locate particularly on the North Slope where  
13 we've been told that there are a number of possible  
14 archaeological sites, if you're going to locate those  
15 it's easier when the weather is less severe.

16 A That's correct, but  
17 I worked in New Mexico and Arizona, where we built  
18 pipelines and I think that's where they first got  
19 interested in archaeology sites back in 1950, and  
20 the archaeologists went ahead of the pipeline route  
21 and located these sites, and we had to re-route the  
22 pipeline sometimes, and I'm sure that Arctic Gas will  
23 have someone that will do this work at a time of the  
24 year that these sites can be located rather than try  
25 to do it in the middle of the winter when the weather  
26 is the most severe. You don't plan a job that way,  
27 the way that you're talking about, locating archaeology  
28 sites.

29 Q I understand that some  
30 of these things may only show up along the walls of





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 the ditch using a ditching machine.

3 A That's correct. We  
4 experienced that same thing in New Mexico and Arizona.

5 Q Yes, and those are the  
6 ones that I'm just suggesting as one of the matters -  
7 and maybe it's not a very serious one, but I'm just  
8 adding up the problems that cause you to shut down.

9 A That's right, and when  
10 you shut the ditch down, you shut the operations  
11 down, you move forward till the archaeologists get  
12 through doing their rain dance over the site.

13 Q I think you'll find that  
14 they don't do too many rain dances on the North Slope.

15 A Well, you know, in  
16 Arizona and New Mexico the Indians are apt to do  
17 rain dances.

18 Q I understand. Now,  
19 my next concern, Mr. Dau, is one that you've heard  
20 before and it is with regard to your using the third  
21 season to do your construction on the North Slope,  
22 and I know and I've heard the answers earlier today  
23 that in the opinions of the gentlemen on the panel  
24 that it can be done. My concern is to ask you whether  
25 it has to be done that way, if for example you were  
26 told by the National Energy Board and the Cabinet  
27 that you would get your permit, and one of the  
28 conditions would be that you had to commence construc-  
29 tion on the North Slope in the first or second con-  
30 struction season. Would that be something that you



Dau, Johanson, Fowler  
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could arrange?

MR. MARSHALL: I'm sure Mr. Dau will say it if I don't, that Arctic Gas itself will have to answer that question, and he as the consulting engineer would be the first one to defer the answer to the closest and most senior Arctic Gas representative, Mr. Daniels, who in turn would probably choose to defer the answer. I'll leave that to Mr. Daniels.

MR. BAYLY: All right, now Mr. Commissioner, I'll rephrase the question and I'm glad Mr. Marshall is back because we haven't had one of these for quite a while.

Q The question I am asking you is not what Arctic Gas should do, and Mr. Marshall, listen to this question. The question is, could it logistically be done, in your opinion, as an engineer?

WITNESS DAU: You're asking me whether we could rearrange the construction schedule?

Q Yes.

A To allow construction on the Arctic coast in more than one winter season.

Q Either that or in another winter season, other than the last one that you plan to do construction.

A It could be done, sir.

Q Yes, O.K. Now, one of the things that you referred to, Mr. Fowler, in



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 your concern with Arctic constructors' lack of  
3 experience in northern construction was that they  
4 just hadn't been involved in that as a consortium,  
5 but I take it that if not the members of your company,  
6 at least some members of your company had been in-  
7 volved in Arctic pipeline construction before, or  
8 northern pipeline construction, if you must call it  
9 that.

10 WITNESS FOWLER: None of  
11 the Brown & Root people that were assigned to the  
12 Arctic group had pipeline experience in the north.

13 Q All right.

14 A Some of the Williams  
15 Brothers people --

16 Q I was going to come  
17 to those, yes.

18 A -- I did not say that  
19 they -- I may have said that they lacked experience;  
20 I said that the equipment that they had was not  
21 properly designed for Arctic work is what I meant.

22 Q I see.

23 A Some of the men that  
24 were on the job had worked on construction in the  
25 Arctic. There was one of the Brown & Root men that  
26 was on the Dew Line construction, and was assigned  
27 to that project.

28 Q Well, what about the  
29 Williams Brothers men? Maybe Mr. Dau would want to  
30 answer that. Is this Williams Brothers Alaska Inc.



Dau, Johanson, Fowler  
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1  
2 related in any way to the Williams Brothers firm  
3 that you have worked for?

4 WITNESS DAU: Used to be.

5 The particular people that are involved in the Arctic  
6 construction group, I'm not familiar; Mr. Daniels  
7 could respond much better than I.

8 Q Mr. Daniels, can you  
9 tell me about the Williams Brothers Alaska Inc. people  
10 were they people with northern construction or  
11 northern pipeline construction experience?

12 WITNESS DANIELS: Not to  
13 my knowledge, Mr. Bayly, and I know the people and  
14 know their position fairly well. I spent six years  
15 with the Williams Brothers organization.

16 Q All right. Did Williams  
17 Brothers Alaska Inc. have people on its staff who were  
18 experienced in northern construction or northern  
19 pipeline construction?

20 A That's the point I  
21 was coming to, Mr. Bayly. Except for the experience  
22 which Williams Brothers Canada had in north-western  
23 Alberta in the early '60s when I was general manager  
24 of the company, and the Haines Fairbanks pipeline,  
25 which Williams Brothers built in Alaska --

26 Q That's the oil fuel  
27 line?

28 A Yes, products line,  
29 built in 1954, Williams Brothers has not had any  
30 winter construction or Arctic pipeline construction





Dau, Johanson, Fowler  
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Cross-Exam by Bayly

1  
2 experience. Those people who were on the '54 job  
3 for example, are almost entirely gone from the  
4 organization; and those who functioned on those  
5 projects with us in Canada in the early '60s where  
6 we did some winter construction, to the best of my  
7 knowledge are no longer in the organization.

8 Q So what you're telling  
9 us, you and Mr. Fowler, is that for the first time  
10 an Arctic pipeline construction project will be  
11 commenced, if Arctic Gas gets the go-ahead, employing  
12 experienced Arctic or northern pipeline construction  
13 people in its planning and operations.

14 A Mr. Bayly, I think that's  
15 absolutely correct. The advantage is that you have  
16 a number of people who have performed pipeline  
17 construction in Canada in the wintertime, in an area  
18 climatically speaking which impinges upon the Arctic  
19 conditions. You have a number of people who have  
20 had Arctic experience in other activities, largely  
21 from Canadian background and experience. Mr. Rymes  
22 is a good example of that. Some of the people who  
23 work for the oil companies and possibly will be  
24 seconded to this project have experience in the  
25 Mackenzie Delta and the Arctic Islands. So that you  
26 have to draw upon that talent and that background, but  
27 the point still remains and it's rather obvious that  
28 no one has built a pipeline of this nature and this  
29 sort under those conditions.

30 Q So that's the one new



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 thing, is for everybody it's new building an Arctic  
3 pipeline in the winter in conditions such as you have  
4 on the North Slope. You've got a number of people  
5 with experiences that are similar, either because  
6 they've actually worked in the Arctic on oil-related  
7 projects or Dew Line projects, and you've got people  
8 with northern pipelining experience from TransCanada  
9 Pipeline or other northern Canada pipelines.

10 A Yes sir. That's a  
11 matter of fact.

12 Q All right. I'd like  
13 to turn now to the Banister ditcher. Now, I guess  
14 this is you, Mr. Dau. You will recall, I think  
15 you and Mr. Williams were around when we were discuss-  
16 ing the earlier Banister ditcher problems in the tests  
17 at Fort Churchill.

18 WITNESS DAU: Yes sir.

19 Q And what I want to know  
20 is whether the tests that are referred to in the  
21 evidence at page 9, in the year 1975 there is a  
22 sentence:

23 "Based on the performance of the latter,"  
24 referring to the model 710,

25 "improved ditcher design, Banister foresees  
26 no problems in constructing even larger  
27 machines for use exclusively in the Arctic."

28 Now, "based on the performance of the latter", I assume  
29 that means in the tests.

30 A Excuse me, Mr. Bayly,



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 whose page 9?

3 Q Oh, I'm sorry. This is  
4 page 9 of this piece of evidence that was given out  
5 by Mr. Marshall, it starts with "Introduction" and  
6 it goes,

7 "E.C.P.L. winter construction."

8 MR. MARSHALL: Mr. Johanson's  
9 evidence.

10 MR. BAYLY: Then these  
11 questions should be asked of Mr. Johanson. If they  
12 are, you're off the hook, Mr. Dau. These are your  
13 questions I should address to you, sir?

14 WITNESS JOHANSON: My  
15 evidence, yes.

16 Q Fine. Are you acquaint-  
17 ed with the evidence that was given by Mr. Williams  
18 and Mr. Dau on the problems at Churchill? Or are  
19 you acquainted with the Churchill tests that were  
20 done?

21 A I know about the  
22 Churchill tests. I know that their machine went  
23 there. I do not know the results. Maybe somebody  
24 else here does.

25 Q All right. Mr. Dau,  
26 perhaps you could just capsulize those and the pro-  
27 blems that were encountered there. I'd like to know  
28 if those problems are being overcome by subsequent  
29 tests?

30 WITNESS DAU: The Churchill





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 tests, Mr. Bayly, was an attempt to test three  
3 ditching machines, that were available at that time.  
4 A Barber-Greene machine, a Banister 710, and a  
5 Henuset machine. Mr. Rymes, I'm sure, could add to  
6 this. At that moment in time we were still in the  
7 process of trying to develop teeth that were  
8 satisfactory for the Arctic for permafrost conditions.  
9 At that time we were trying to find an area in which  
10 we could easily ship these large machines and their  
11 equipment into a permafrost area. We informed a  
12 saw-boring operation at Churchill, we concluded that  
13 it would be an extremely difficult test at Churchill,  
14 in fact it was much more difficult than we thought  
15 and Mr. Rymes can probably respond, I think all of  
16 the teeth were a complete failure at that particular  
17 test.

18 Q Does that familiarize  
19 you with the test and do you have any knowledge of  
20 what was done to the teeth to improve them since that  
21 particular test?

22 WITNESS JOHANSON: I personal-  
23 ly don't, but I'm sure Mr. Rymes does.

24 Q Mr. Rymes?

25 WITNESS RYMES: Yes, Mr.  
26 Bayly, if I could take you back to the Churchill test  
27 for just a moment. As Mr. Dau said, there were  
28 three essentially three ditchers at the test program  
29 in Churchill, and also at Gilham, and during that  
30 time only standard available, commercially available



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 teeth were tried. There was no effort in teeth  
3 dev\_elopment in terms of research. They were simply  
4 the introduction of standard teeth that were readily  
5 available on the market and which had been well and  
6 truly used in many, many areas, and these -- two of  
7 the machines, the Banister 710 and the Henuset  
8 machine, were significantly larger than the Barber  
9 Greene and I think the sum result of the Churchill  
10 test, if you wish a summation of it, was that it  
11 was possible to build big machinery. But the problem  
12 lay in the teeth development.

13 Q That's what Mr. Dau  
14 and Mr. Williams essentially told us when they were  
15 here previously. Can you tell me what has been done  
16 to improve the teeth since those tests were done  
17 in Churchill in 1973?

18 WITNESS DAU: Yes, I think  
19 I can, Mr. Bayly. There were some other interim  
20 developments since that time that took place, and  
21 there were some teeth evaluated on the Banister 710  
22 in frozen gravel, in Edmonton, approximately 2½ years  
23 ago. Again these were more or less standard tech-  
24 niques, if you will, in building teeth, and I  
25 think that proved once and for all that that approach  
26 in attempting to use standard teeth was simply not  
27 going to work in these very difficult soils. At  
28 that time a very extensive program was undertaken  
29 to first of all review -- and I mean a significant  
30 review -- of all of the teeth that had been tested



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 to that date, including those at Churchill, those  
3 at Gilham, the ones in Edmonton, the ones in Sans  
4 Sault, and a very deep and detailed mechanical and  
5 metallurgical evaluation were made of these teeth.  
6 In other words, what we were trying to do was to  
7 assess what was wrong or to try to find out what  
8 was wrong before we could embark on a program.

9 Since that time, significant  
10 developments have been made in both teeth design and  
11 teeth dynamics, if you wish to call it that, and in  
12 metallurgy, substantial advances.

13 Q Now, when you say  
14 "substantial advances" can you tell me whether you  
15 now have a tooth that can be manufactured that has  
16 been tested satisfactorily either under permafrost  
17 conditions or in the frozen gravel conditions you  
18 referred to in the provinces?

19 WITNESS RYMES:

20 A Mr. Bayly, I would  
21 just be delighted to sit here and talk for two or  
22 three days on engineering matters with you. I think  
23 it would be very refreshing, but --

24 Q Now, don't --

25 A -- if I could put it  
26 this way, I'd like to -- Mr. Dau in his testimony  
27 has indicated that a full-scale very expensive test  
28 program will be undertaken this coming winter at  
29 Norman Wells, and there will be five differentteeth  
30 manufacturers involved with different styles of  
31 teeth which will be evaluated. Now, as you're well



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 aware, the idea and the concept of taking full-scale  
3 equipment under Arctic winter conditions is an  
4 extremely expensive operation and we are going at  
5 that point because we feel that these advances have  
6 been made and they now must be evaluated.

7 Q So what we have now are  
8 five teeth the various manufacturers think will do  
9 the job which will be tested this winter.

10 WITNESS DANIELS: Mr. Bayly,  
11 I'd like to make one point, if I can, on the subject,  
12 and that is this question of permafrost. There's  
13 a whole range of soils which are permafrost. All  
14 frozen rock is permafrost. There have been in exist-  
15 ence for over 25 years ditching machine teeth that  
16 will cut certain types of permafrost soil.

17 Q I'm sorry I wasn't more  
18 specific, Mr. Daniels. I didn't want to cover old  
19 ground, and we've been instructed on that by Arctic  
20 Gas and others, and I realize that Churchill was a  
21 permafrost soil with a considerable amount of large  
22 rock and coarse material in it. It's quite different,  
23 I know, from frozen silt which may also be permafrost,  
24 or anything in between, including frozen solid consoli-  
25 dated material.

26 A Well, as Mr. Rymes  
27 started to tell you, the program now under way, in  
28 fact there are two programs under way, that plan to  
29 address that problem of maximizing the capability of  
30 these teeth to work in permafrost soil, in other words





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Bayly

1  
2 to give a wider range of soils which can be cut  
3 with these ditching machines, and these variety of  
4 teeth. The 710 is now in Norman Wells and will be  
5 tested with these variety of teeth that have been  
6 redesigned and rebuilt by five different manufacturers  
7 this coming winter in February. Arctic Gas has  
8 entered into a letter of intent with Banister Pipelines  
9 and with J.E. Rymes Engineering to begin the fabrica-  
10 tion and structure of the 812 machine.  
11  
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Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Bayly

1 Q That <sup>machine</sup> hasn't been  
2 manufactured but is larger than the 710 and does the  
3 same job essentially?

4 A Essentially an enlarge-  
5 ment of the 710 is strengthening and perhaps the beefing  
6 up of horsepower --

7 Q And presumably it should  
8 use the same kind of teeth?

9 A Yes the teeth problem  
10 would be very similar in the types of machines. The  
11 basic problems would hardly vary at all. And it's  
12 intended then to use the information from the 710 test  
13 this winter and the schedule for the completion of the  
14 812 machine is September 1, next year, with the idea  
15 that it will be shipped to a test site for further  
16 testing in the winter of '77 - '78.

17 Q Now would it be this two  
18 series of tests which will determine whether the ditcher  
19 can be used extensively on the north slope as opposed  
20 to a blasting operation?

21 A Mr. Bayly, your use of  
22 the word extensively, I think is correct and there's  
23 no question that a great deal of the soils questions  
24 can be cut with the ditching machine. The 710 will  
25 cut a great deal of the soils we will encounter over  
26 the Arctic Gas route. The question is the extent and  
27 the difficulty of soils which can be cut with the  
28 machine, which is why we're going to the 812 develop-  
29 ment, why we're spending all the time and effort to  
30 design teeth that will perform better and there are



1 other factors, besides just the teeth. The bucket  
2 weights and the wheel segment weights and so on and  
3 so forth, but, the objective is, to produce a machine  
4 that will have a greater range of usability on the  
5 project than the 710 does. There, in the minds of  
6 those people who are the experts and I don't consider  
7 myself an expert in this particular field, but, in the  
8 minds of those people, there isn't any question, that  
9 the 812 will work, because the 710 will work. The  
10 question is, the extent to which it will cut the soils  
11 we will encounter.

12 Q Until those tests have  
13 been done, I take it that the proportion of ditching  
14 to blasting that has to be done on the north slope,  
15 those estimates remain the same until we now the results  
16 of those tests?

17 A Yes sir, those would  
18 have to remain the same until we have better evidence  
19 and better information to use.

20 Q Those are all the questions  
21 I have of this panel. Thank you gentlemen.

22 MR. GOUDGE: Mr. Hollingworth,  
23 from Foothills Pipelines.

24 CROSS-EXAMINATION BY MR. HOLLINGWORTH:

25 Q Mr. Walker, as I under-  
26 stand it, your experience in winter construction has  
27 been on the Trans Canada Pipeline system basically in  
28 northern Ontario?

29 WITNESS WALKER: That's correct.

30 Q And in no other place?





Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 A That's correct.

2 Q And you would agree with  
3 me sir, that's similar to the sort of conditions that  
4 might be encountered in the northern parts of Alberta  
5 and British Columbia on winter construction projects?

6 A I think so.

7 Q And to that extent then,  
8 the experience of Trans Canada Pipelines isn't likely  
9 to be much different from that of Alberta Gas Trunk  
10 Line or West Coast Transmission?

11 A I think that's generally  
12 correct.

13 Q And that's what's really  
14 referred to as the conventional winter construction  
15 technique rather than Arctic Construction techniques?

16 A Yes sir.

17 Q Did you say, you did use  
18 these welding shelters from time to time on your winter  
19 work?

20 A No sir. We didn't use  
21 them at all. The only shelters that were used was a  
22 sort of a tarpaulin rigged up over the tack rig to keep  
23 snow from falling on the -- where the welding was being  
24 done. Occasionally they used what we called a donut.  
25 It was a piece of plywood made to fit over the pipe to  
26 try to block off some of the wind when the welders were  
27 welding. That was about the extent of shelters that was  
28 used in our work.

29 Q But certainly sir, you'll  
30 agree with me that a type of shelter for welding purposes



Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 on pipelining work is not a new technique?

2 A There has been some other  
3 tent type shelters for welding, in the southern part  
4 of Canada, but, I tend to think sir, that the shelters  
5 that have been described in the diagrams that we saw  
6 earlier today is a new technique.

7 Q Mr. Fowler, your employer  
8 is Brown & Root?

9 WITNESS FOWLER: Yes sir.

10 Q And they are one of the  
11 partners of the Arctic Constructors consortium?

12 A Yes sir.

13 Q And another of those  
14 partners is Williams Bros?

15 A Yes sir. They're the  
16 sponsor.

17 Q They're the sponsor,  
18 the managing partner if you like?

19 A Yes sir.

20 Q And much the same way the  
21 Trans Canada's the managing partner of Polar Gas?

22 A I don't know that.

23 Q All right. Now, I didn't  
24 quite catch your response Mr. Dau, did you say that  
25 Williams Bros. which is the partner in Arctic Con-  
26 structors is no longer related to the Williams Bros.  
27 Canada?

28 WITNESS DAU: That's correct.

29 Q Why is that the case sir?  
30 I was under the impression that Williams Bros. Canada



Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 was owned by Williams Bros?

2 A No sir, that's not correct.

3 Q They have no interest in  
4 it whatever?

5 A Well, the Williams Bros.  
6 that was the construction company and I'm sorry I can't  
7 give you the exact dates, they go back in Canada to  
8 1923-'24, soemthing like that. They built the first  
9 gas pipelines in Alberta. Had an engineering arm that  
10 was called Williams Bros. Engineering Company. The  
11 Williams Bros. Company changed their name to the Williams  
12 Company and sold the engineering arm to another firm  
13 that was --

14 WITNESS DANIELS: It's now in  
15 the ownership of the United States Filter Company.

16 WITNESS DAU: Yes, there was  
17 a name change, United States Filter, and United States  
18 Filter have an engineering organization called the  
19 Resource Science Corporation of which a subsidiary is  
20 Williams Bros. Engineering Company.

21 Q All right. So Williams  
22 Bros. Engineering and Williams Bros. Contracting are  
23 not related in any way?

24 A In no way. I understand  
25 there's a extreme minor share interest in stock --  
26 I'm sorry, the Williams Companys own a very minor in-  
27 terest in U.S. Filter but it's like blah.

28 Q It's that -- to indicate  
29 a mere nothing. A waiving of the wrists?

30 A A mere nothing as I under-



Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 stand it sir.

2 Q All right now Mr. Fowler,  
3 getting back to you again, are you pretty familiar with  
4 this Arctic constructors job?

5 WITNESS FOWLER: No sir.

6 Q No. Perhaps Mr. Daniels --

7 A I left the project in  
8 February of '74.

9 Q Well you were working  
10 around there after that time, weren't you?

11 A All I know is just here-  
12 say.

13 Q I see, well we've heard  
14 a lot of that today. Possibly Mr. Daniels, has some  
15 hearsay he can impart.

16 MR. MARSHALL: You've probably  
17 got a little too.

18 Mr. Daniels, do you  
19 happen to know if Arctic Constructors got the contract  
20 to constuct that entire fuel line that you mentioned  
21 today?

22 WITNESS DANIELS: Yes sir, it  
23 was part of their assignment for the particular section  
24 that -- it is contiguous with the section which they  
25 added for the 48 inch line.

26 Q And that's the line hook-  
27 ing up Pumping Stations 1 through 4?

28 A Yes sir.

29 Q And they got the contract  
30 for, that entire line?





Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 A Yes sir.

2 Q They didn't finish that  
3 contract, did they?

4 A No sir.

5 Q And in fact, they lost  
6 the contract? It was taken away from them

7 A Yes that's true, because  
8 they did such a poor job. They didn't finish it and  
9 the decision was -- was to award it to someone else.

10 Q I see. Now Mr. Fowler,  
11 the project of which you showed us photographs, I take  
12 it that it's obvious, there was no ditching done on  
13 this project?

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Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 WITNESS FOWLER: Yes.

3 Q And you used the gravel  
4 pads which appears in the photographs for support.  
5 That is to say that vehicles used that pad to get  
6 onto the snow pad. I think we discussed that earlier  
7 on.

8 A That's correct, but  
9 this road is the main road coming from one of the  
10 dock areas to bring in the modules and the supplies  
11 to the B.P. Alaska construction effort.

12 Q But there was nothing  
13 stopping you using it for your --

14 A That's correct.

15 Q Now, the men working  
16 on your project, were they on a rotation system of  
17 employment? Did they go out periodically for what  
18 is known as R. and R.?

19 A As far as rotation,  
20 the construction men on the pipeline are up two  
21 months and two weeks off.

22 Q This particular job  
23 is two months on and two weeks off.

24 A Yes sir.

25 Q And that, Mr. Dau, is  
26 somewhat different from the scheme that Arctic Gas  
27 has in mind, isn't it?

28 WITNESS DAU: We have not  
29 defined --

30 Q I'm sorry?



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 A We have not defined  
3 the definitive arrangement of so many months or weeks  
4 on and so many weeks off. The cost estimates reflect  
5 a total number of man days, plus an allowance for  
6 travel in and out, plus an allowance for -- I can't  
7 think of the exact term we use, but it's the training  
8 program, the processing of people. It's an allowance  
9 of a certain percentage for whatever environmen tal  
10 training, if you will, that's required, but we have  
11 never defined a set term of time in and time out, sir.

12 Q Well, these weighty  
13 charts of yours we received from time to time showing  
14 a peak of about 8,000 men, is that actual number of  
15 men required when you don't even know the rotation  
16 scheme, or is it the number of men required on the  
17 basis of man hours that have been determined to  
18 complete the job?

19 A It would be the peak  
20 of the number of people that would be working at one  
21 particular moment of time.

22 Q But you don't know at  
23 this time how many people will be off on rotation.

24 A No sir, that has not  
25 yet been defined.

26 Q Well, how can you  
27 possibly calculate the peak number of men?

28 A Sorry, I don't under-  
29 stand your question. The peak number of men that  
30 we have defined is the peak number of men on the job





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 at any particular moment in time. As far as the cost  
3 estimates are concerned, we have allowed -- I'm sorry,  
4 I can't recall the exact number of how many trips in  
5 and out for each individual in any winter construction  
6 season, in addition to that we have an allowance,  
7 as I recall it's expressed as a percentage of labor  
8 to take care of what we have defined as personnel  
9 processing.

10 Q I see, all right. Now,  
11 Mr. Fowler, it's your basic premise then that this  
12 Arctic Gas project could be built in the way that  
13 it's been conceived.

14 WITNESS FOWLER: That's a  
15 question?

16 Q Isn't that an assertion  
17 that you're putting forward to this Inquiry, that the  
18 Arctic Gas project across the North Slope can be  
19 built as conceived?

20 THE COMMISSIONER: As proposed  
21 by the company.

22 MR. HOLLINGWORTH: Yes.

23 WITNESS DANIELS: If I may  
24 interject, Mr. Fowler has not studied the Arctic Gas  
25 construction plan. We have not asked him to and he's  
26 not familiar with that construction plan.

27 Q All right. Well then  
28 let me ask you this, Mr. Fowler. Is it your conten-  
29 tion that essentially/<sup>if</sup>you're prepared to spend enough  
30 money and spend enough time you can do anything on the



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 North Slope?

3 WITNESS FOWLER: Everybody  
4 realizes that.

5 Q Well, it was you who  
6 told the National Energy Board that since we've put  
7 a man on the moon, we can do it. Weren't those your  
8 words?

9 A That's right.

10 MR. HOLLINGWORTH: Yes.

11 THE COMMISSIONER: Well, in  
12 some measure that principle has been applied with  
13 the construction of the Alyeska line, hasn't it,  
14 where the engineering forecasts turned out in respect  
15 of soils and many other things to be quite unhappy,  
16 so to speak, by simply spending more money and  
17 elevating the line it was built but costing many times  
18 more than the proponents had indicated it would cost.  
19 Nothing wrong with it, this happens every day, it  
20 happened in Canada at the Olympics, I think. You  
21 just keep pouring money in and you -- once you're  
22 committed you really don't have any choice, you're  
23 in the glue, you've got to keep going till you get  
24 there. That's about the size of it, isn't it?

25 A That's correct, but  
26 we have to realize this <sup>is</sup> the first 48-inch pipeline  
27 that was built in the United States any length, and  
28 also it is the first pipeline that's been built  
29 in the Arctic, and we not only attempted to build  
30 a line in the Arctic, we are prepared to build a 48-



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 inch pipeline, and I think that the people that have  
3 been on the projects in the Arctic in relation to  
4 Alyeska construction have learned considerable about  
5 working in the Arctic.

6 Q You know, you people  
7 in a sense, it seems to me, are trying to have it  
8 both ways. They've learned a lot, but poor old Mr.  
9 Moolin opens his mouth in New York and says, "We  
10 couldn't work in December and January because it  
11 was too cold for the men and equipment," then you  
12 say, "Well, he doesn't know what he's talking about."  
13 I think you said it nicely but that's essentially  
14 the position you took. You see, you want to  
15 build the first buried chilled gas pipeline anywhere  
16 in the world. Certainly it's a different animal from  
17 the elevated hot oil pipeline, and of course, so far  
18 as the severest Arctic conditions are concerned, if  
19 you bring it along the coast for 400 miles you're  
20 doing something that in many respects is quite a bit  
21 different from what you did in taking that Alyeska  
22 line from Prudhoe Bay down to the Brooks Range.

23 You know, I know you're  
24 here to say, "well, we can do it." You know, that's  
25 your business and I know you have every confidence  
26 in that.

27 A I agree with you, but  
28 we have learned that we can work in the winter.

29 Q Yes.

30 A In the Arctic,



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth  
THE COMMISSIONER:

Oh yes, you went into

that at length. I appreciate everything you said,  
don't worry, I have it well in mind. It won't be  
necessary for us to go through it again.

MR. HOLLINGWORTH: Mr.

Fowler, you're saying then that with the precedent  
of Alyeska, we can take a lesson from what they have  
learned and draw some conclusions from it, and make  
valuable use of their experience. Is that correct?

A We better learn from  
their experience.

Q Pardon?

A We had better learn  
from their experience.

Q I still didn't hear what  
you said.

A We had better learn  
from their experience.

THE COMMISSIONER: We had  
better learn, and I think we can all support that.

MR. HOLLINGWORTH: Q So your  
suggestion to Arctic Gas proponents would be that they  
should take a good long look at the Alyeska experience.

A I think anyone building  
a pipeline or any construction in the Arctic should  
take it into consideration. They have to.

Q From Alyeska's winter  
pipeline experience. Right?

WITNESS DANIELS: Mr. Holling-  
worth, I would go after positive and negative





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 things to be learned from such an experience.

3 Q Well, could I get an  
4 answer from Mr. Fowler first? I want to talk to  
5 you afterwards, Mr. Daniels. That's what Arctic  
6 Gas should take a lesson from, is from Alyeska's  
7 winter pipeline experience. Now isn't that right?

8 WITNESS FOWLER: That's  
9 correct.

10 Q Yes. Now, Mr. Daniels,  
11 I gather that you at the National Energy Board at  
12 page 11520 quoted Mr. Dau, and Mr. Dau is right  
13 beside you to contradict you if this isn't correct,  
14 where you said:

15 "I take Mr. Dau's answer,"  
16 and I did read that this morning in the library,  
17 "to mean that he could draw no conclusions  
18 or corollaries between Alyeska's winter  
19 pipeline experience and this project, and  
20 with that statement I do agree."

21 WITNESS DANIELS: I certainly  
22 do, that in concept the two projects are significantly  
23 different. You're talking about a hot crude oil  
24 pipeline of which over 50% is on <sup>vertical</sup> structures above  
25 the ground, as compared with a chilled buried gas  
26 pipeline for its entirety, and that's a significantly  
27 different engineering concept.

28 Q I'm not even an  
29 engineer but I'll grant you that. But you said here  
30 --



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

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A But you said here that's what Mr Dau said Mr. Gibbs referred to in his cross-examination of Mr. Dau previously, and I agreed with that.

Q It's a different engineering concept but you're saying that you can't use Alyeska's winter pipeline experience at all.

A Alyeska's winter pipeline experience has some value, both negatively and positively.

Q But you can't use it.

A Certainly there's benefit to be gained from it.

Q You said you agreed with Mr. Dau, who said you could draw no conclusions or corollaries between Alyeska's experience and this project, referring to Arctic Gas.

A Primarily I'm using that testimony which went back to an engineering concept.

MR. HOLLINGWORTH: O.K.

THE COMMISSIONER: It's not about the effect of the climate and the cold and the dark on the performance of men and equipment.

A His comment was not confined to, but was directed largely to a question which Mr. Gibbs had given some months earlier, which was related basically to the engineering concept between the two pipeline projects.



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 MR.HOLLINGWORTH: Q Mr. Dau  
3 said --

4 A And with that I agree.

5 Q Mr. Dau, you're sitting  
6 back there looking comfortable. Isn't that what  
7 you were talking about?

8 WITNESS DAU: Yes, I'd like  
9 to see the reference and I'd like to read it into  
10 the record, if I could. Do you have it, sir?

11 Q I have it right in  
12 front of me. It's on page 11520 of the National  
13 Energy Board proceedings on September 8, 1976.

14 A No sir, I'm talking  
15 about the one where I was being cross-examined by  
16 Mr. Gibbs.

17 Q No, I don't have that  
18 reference.

19 A Because I think you're  
20 taking it entirely out of context.

21 THE COMMISSIONER: Isn't  
22 it logical that the interpretation that Mr. Daniels  
23 puts on it seems to make sense?

24 A And I'm sure that's  
25 what it was. I just wanted to get it correct, sir.

26 Q Didn't TransCanada --  
27 isn't TransCanada's latest loop 48-inch, or is it  
28 42-inches?

29 WITNESS WALKER: The one  
30 that's being submitted to the Energy Board now for





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 construction in 1977?

3 Q No, Mr. Fowler has said  
4 that the Alyeska line was the first 48-inch pipeline  
5 in North America. I had a recollection of Mr. Horte  
6 saying that the most recent loop already completed  
7 by TransCanada was maybe --

8 A 42-inch, sir.

9 Q -- 42?

10 A Interprovincial doesn't  
11 have 48-inch pipe, sir.

12 Q Mr. Dau was speaking  
13 of the United States then.

14 WITNESS DANIELS: Interpro-  
15 vincial has 48-inch in place in Canada.

16 MR. HOLLINGWORTH: Q Mr. Dau,  
17 that reference is apparently at page 3596 of your  
18 evidence at the National Energy Board. O.K., this  
19 is on page 11519 of these same proceedings and the  
20 question is from Mr. Gibbs.

21 "Q I wonder if you are really on all fours  
22 with Mr. Dau? Perhaps you read this  
23 when you and I were in the library this  
24 morning, Mr. Daniels.

25 Mr. Dau at page 3596 of his evidence, and I asked  
26 him about this specifically both of those things, I  
27 said to him:

28 "Well, sir, as I understand it, this is my  
29 question, compared with similar northern  
30 activities, the most you could reasonably



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 expect to obtain in spread F is about 3,000  
3 feet per day. Does that coincide with your  
4 knowledge of other people's operations?  
5 You may do better than what other people have  
6 done.

7 MR. DAU: No sir, I can't agree with that.  
8 I think we will achieve the progress rate  
9 that we have planned here.

10 Q Did Alyeska conduct any winter  
11 pipelaying operations?

12 A Yes sir.

13 Q Do you know what their average daily  
14 production was per spread?

15 MR. DAU: No sir.

16 Q Did you not think that that would be  
17 a useful thing to know because they have the  
18 experience?

19 MR. DAU: No sir, I think their system is so  
20 totally different from ours that it is mean-  
21 ingless to attempt to make any comparisons."

22 WITNESS DAU: I agree with  
23 that, sir.

24 Q You agree with that,  
25 and that was discussing engineering concepts, was it?

26 A No sir, it's more than  
27 that.

28 MR. MARSHALL: You see, Mr.  
29 Hollingworth, you have to read the whole thing and  
30 if you go onto page 11521 of the N.E.B. transcript



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 where Mr. Gibbs is referring back to the transcript  
3 of these proceedings. He asked the other question:

4 "In what respect do you find the TransCanada  
5 Pipeline project to be comparable to the North  
6 Slope portion of your project?"

7 Now that's really what you're asking. The answer  
8 Mr. Dau gave in that transcript:

9 "It is not, sir, only in the sense that it  
10 was a winter operation and the temperature  
11 extremes. That would be the only things  
12 that would be comparable."

13 If we keep up like this  
14 you'll never get your plane.

15 MR. HOLLINGWORTH: Well, I'm  
16 not too concerned .

17 Q Well, Mr. Dau, I  
18 still look at that quote of yours, and you say you  
19 can draw no conclusions or corollaries between Alyeska's  
20 winter pipeline experience and the Arctic Gas project.  
21 You're telling me that that's nothing to do with the  
22 thing that I'm discussing.

23 A Mr. Hollingworth, I've  
24 done this several times here, and I think at the  
25 National Energy Board also. The Alyeska project and  
26 its buried mode made a deliberate attempt to find  
27 thaw-stable soils. Those are gravels, rock soils  
28 with low ice content.

29 THE COMMISSIONER: Where you  
30 get ice-rich permafrost, you elevate it.



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 A Yes sir, you go above-  
3 ground.

4 Q Yes, so --

5 A We -- and I say I've  
6 done this several times -- our criteria is entirely  
7 different.

8 Q Let's not  
9 start that.

10 A I'm sorry, I just can't  
11 draw on Alyeska's experience on winter construction  
12 winter burial of pipelines and apply that to what we  
13 are trying to do. They are entirely different, in  
14 my view. They're different from an engineering  
15 concept, a design concept, construction concept,  
16 just as far as you want to go. One is a hot pipeline  
17 and one's a cold pipeline, and I don't think that  
18 you can compare them.

19 MR. HOLLINGWORTH: Now, Mr.  
20 Dau, we all know that.

21 Q All right then, let's  
22 go on. Mr. Rymes, as I understand it, you're  
23 basically here on the panel to discuss your exper-  
24 ience with both the super ditcher and with construc-  
25 tion equipment generally and its use in Arctic  
26 conditions or winter conditions. Is that correct?

27 WITNESS RYMES: I think  
28 that's a fair statement.

29 Q Have you, sir, been  
30 involved on a pipeline construction job?





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 A No sir, I made no  
3 pretense on that.

4 Q And obviously then not  
5 on a pipeline job in winter conditions.

6 A No sir. I'm not a  
7 pipeline engineer.

8 Q Mr. Johanson, you're  
9 with Banister Pipelines in Edmonton?

10 WITNESS JOHANSON: Yes.

11 Q Is Banister connected  
12 with a company known as Northcan Banister?

13 A No. We were at one  
14 time.

15 Q I see. Does the company  
16 exist now?

17 A Not with us involved  
18 in it. I believe there is still a Northcan of some  
19 type but I really don't know what the actual name of  
20 it is. We are not involved.

21 Q When did you discontinue  
22 your affiliation?

23 A Oh, basically last  
24 spring.

25 Q Northcan is an  
26 affiliate of Northern Engineering Services, isn't it?

27 A Not to my knowledge.

28 WITNESS DANIELS: It is a  
29 competitor.  
30



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 Q Mr. Johanson, the project  
3 that you discussed on the North Slope, was any ditching  
4 done on that project?

5 WITNESS JOHANSON: No sir.

6 Q Was any coating of  
7 pipe done on that project?

8 A None other than the  
9 insulation of the pipe.

10 Q Not the conventional  
11 pipeline wrapping tape?

12 A No.

13 Q On the huts that you've  
14 been describing, for want of a better word I'll use  
15 that one, and the ones of which you -- can you hear  
16 me?

17 A That's better.

18 Q The huts of which  
19 you've shown us photographs, and I use that word or  
20 you can give me another word to use if you like, I'm  
21 just using it for want of a better one, are any  
22 bending activities possible in that structure?

23 A Well, we could pass a  
24 slight bend through the building quite easily, but  
25 a very stiff bend, no; and it's not contemplated  
26 that this building be used for the Canadian Gas  
27 Arctic work. It was simply in there to describe what  
28 can be done.

29 Q I see. Arctic Gas has  
30 not planned to use this, to your knowledge.



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 A Not to my knowledge, not  
3 this particular one. No, they have their own design  
4 as you saw this afternoon.

5 Q I see. Mr. Dau, isn't  
6 one of the important features of the proposed 812  
7 machine, the Banister ditcher, that it can dig 12  
8 feet deep?

9 WITNESS DAU: Yes, we think  
10 that's important.

11 Q That's important to  
12 you, isn't it?

13 A Yes, it is.

14 Q Because part of your  
15 geotechnical program relies on the weight of the  
16 overburden of that much soil as a measure against  
17 frost heave.

18 A That would be a minor  
19 consideration with respect to the depth of the ditcher.  
20 I think the primary concern would be related to the  
21 fact that there is, if I could define it, as micro-  
22 relief in the areas where snow pads would be used,  
23 and as I've explained several times, the depth of the  
24 snow pad would vary to accommodate that micro-relief  
25 in the terrain, and therefore with having a relatively  
26 smooth snow pad that we will wind up with varying  
27 depths of pad and we want to have the minimum cover  
28 over the depressions in the terrain. So therefore  
29 it's important in my view to have a depth capability  
30 in the machine.













Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

Q Well, let me ask this:

If you use the 710, which has the capability of digging ten feet, would you do any further depth ditching?

A probably.

Q And what would you use for that, backhoe?

A Yes, we'd have to if we only had the 710, sir.

Q And that would retard your progress somewhat, wouldn't it?

A No sir.

Q No?

WITNESS DANIELS: Mr.

Hollingworth, I think there's a misconception. He's not talking about a deeper ditch where the 710 cuts, he's talking about in certain locations you would have to have a deeper ditch. It doesn't mean that after he digs a 10-foot deep ditch he has to come along and deepen it with an 812.

Q My question meant as a general rule would you dig a deeper ditch than a 710 could do?

A There certainly is a range of ditching activities where a 710 would provide, the ditch configuration that we require but there are other circumstances where it would not. That happens on a pipeline in any location and you then go to the backhoe as the normal method of getting that.



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 Q Well, on what percentage  
3 of the case of the line would ten feet be adequate  
4 depth?

5 A With the 710?

6 Q Yes.

7 A You don't know that  
8 until you profile the complete pipeline.

9 Q I'm sorry, I can't make  
10 out what you're --

11 A Until you know the  
12 complete figure -- configuration, vertical configur-  
13 ations throughout the whole pipeline which is the  
14 profile of the pipeline, you wouldn't know that.

15 Q So you couldn't even  
16 give me an approximation right now.

17 A I could make a guess  
18 but that's all it would be.

19 Q Well, make a guess.

20 A I would guess that the  
21 710 could probably at this stage cut somewhere in  
22 the range of 60 to 70% of the ditch configuration  
23 that we would require on the system. Now that --  
24 there are some reasons you always would like to have  
25 a ditching machine with a greater capability, I  
26 don't care if you're laying pipe in Saskatchewan,  
27 because when you come to a road crossing or to a  
28 creek crossing, any place else where you have to get  
29 greater depth, if you go beyond, the requirement goes  
30 beyond the capability of the ditching machine, then





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 you then have to do it with a backhoe or some similar  
3 machine. So we would have a variety of circumstances  
4 -- any pipeline would have -- where the requirement  
5 might go beyond the capability of the ditcher, and  
6 this is one of the reasons for having a 12-foot  
7 ditch capability of the 812.

8 Q Mr. Daniels, I believe  
9 it was you a little earlier said that the 710 would  
10 have to be powered up somewhat to bring it into line  
11 with what was conceptualized for the 812.

12 A No sir, I didn't say  
13 that. I said that's a thing that we would investigate  
14 and are planning to investigate as to whether that  
15 is necessary or not.

16 Q Mr. Johanson, can you  
17 help us here?

18 WITNESS JOHANSON: I thought  
19 at that time he was referring to the 812.

20 Q Would the 812 be  
21 more powerful than the 710?

22 A Yes.

23 Q How much more?

24 A I think Mr. Rymes is  
25 probably more capable of answering that, but again  
26 it would probably be in the range of about a third  
27 higher, in horsepower.

28 Q The 710 is 850 horse-  
29 power, isn't it?  
30



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 A Yes.  
3 Q Something like that,  
4 did you say, Mr. Rymes?  
5 WITNESS RYMES:870, yes.  
6 Q Was it the Henuset machine  
7 that was tested at Seebe?  
8 A No, it was not, Mr.  
9 Hollingworth.  
10 Q Which machine was  
11 tested there?  
12 A The 710,  
13 And it didn't work very  
14 successfully. A I beg your pardon?  
15 Q And it didn't work very  
16 successfully.  
17 A It worked very well.  
18 Q How many feet did it  
19 dig?  
20 A Are you speaking at  
21 Seebe?  
22 Q Yes.  
23 A The total number of  
24 feet?  
25 Q Linear feet.  
26 A The total number of  
27 lineal feet?  
28 Q Yes.  
29 A I don't recall right  
30 offhand, Mr. Hollingworth. We could get that information.



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1

2

Q Was it a mile?

3

A Pardon?

4

Q Was it a mile?

5

A No, it was nothing

6

like that.

7

Q Half a mile?

8

A I don't recall the

9

figure, but it was not -- no, I don't think it would  
be half a mile.

10

11

Q I think that a large

12

portion, the buried portion of the Alyeska line was  
dug by blasting and backhoe.

13

14

WITNESS DANIELS: I have

15

no idea what percentage was dug by blasting and

16

backhoe. It undoubtedly was a good portion of it.

17

Q How about you, Mr.

18

Johanson, can you help us here?

19

WITNESS JOHANSON: I can't.

20

Mind you, they don't have any large ditching equipment  
up there other than the backhoes and so on, but it  
could not be a large portion because approximately  
half of that line is above-ground.

22

23

24

Q But that still leaves

25

400 miles or so, and you don't know what portion of  
that was dug by a conventional ditcher, and what  
portion was blasted?

26

27

28

A No, I don't.

29

Q Nobody on the panel

30

can help me here?





Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

WITNESS DANIELS:

A Perhaps I can help you  
a bit, Mr. Hollingworth. The use of conventional  
ditchers or the standard production ditchers in  
existence today, and those ditching machines are  
hard put, we say, to dig a 48-inch ditch configura-  
tion in any excepting minimal configurations, so what  
I'm saying is that because of that first of all they  
weren't able to utilize a ditching machine as much  
as they might have liked to, and secondly, Mr. Dau  
mentioned a moment ago their underground design was  
to go to the harder soils and so a good portion of  
their line, underground line was in rock and in the  
soils that were difficult to dig. So I suspect  
that a good portion of it, a very significant portion  
of the line was dug by backhoes. How much basting  
was involved, I'm afraid I couldn't give you much of  
an idea of that.

Q They didn't use the  
710 on the Alyeska line?

A No, the 710 wasn't there.

Q When did the 710 come  
into existence?

A When was that, Mr.  
Johanson?

WITNESS JOHANSON: Well, I  
believe it might be 1972.

Q 1972?

A Right. There is only  
one machine at this point in time.



Dau, Johanson, Fowler  
Rymes, Walker, Daniels  
Cross-Exam by Hollingworth

1  
2 Q Is that the one that  
3 was developed with a Pait grant?

4 A Either Pait or Erdia(?)  
5 or one of them.

6 WITNESS RYMES: Mr. Holling-  
7 worth, I'd like to come back to your statement on the  
8 Seebe test site. The 710, and I think you inferred  
9 it didn't go very far, and you're right, it didn't.  
10 That was because that particular time we were  
11 ditching in frozen shale, which is virtually bedrock.  
12 Now that's Seebe, Mr. Commissioner.

13 THE COMMISSIONER: What's the  
14 place?

15 A Seebe.

16 MR. HOLLINGWORTH: S-E-E-B-E.

17 A Just outside of  
18 Calgary, but it was digging in frozen bedrock and  
19 that is the primary reason why it did not go very  
20 far. It had nothing to do with the machine at all.

21 Q Wasn't the original  
22 purpose of going to Seebe, was that after a careful  
23 search finding some soil conditions that would  
24 approximate permafrost?

25 A Yes sir, it sure was.  
26 That particular soil turned out to be very homogeneous  
27 and what was lacking in that soil were the impact  
28 properties.

29 THE COMMISSIONER: Can I  
30 just go back, M r. --



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 THE COMMISSIONER: Let's go  
2 back, Mr. Fowler, to something you were mentioning  
3 earlier. When you worked on that job near Prudhoe  
4 Bay and they had the rule the first winter that you  
5 had shut down at minus thirty-five. It was either  
6 minus thirty-five degrees Fahrenheit or the equivalent  
7 wind chill temperature.

8 A Yes.

9 Q Right. And you felt  
10 that was unduly conservative and in fact, in the  
11 following winter, the men were quite able to work  
12 at temperatures well below that?

13 A Yes.

14 Q That was roughly the  
15 story of that operation?

16 A Yes, sir.

17 MR. HOLLINGWORTH: Mr. Dau,  
18 could I get you to look at Exhibit 855 please. If  
19 you could turn to the Komakuk Beach page.

20 WITNESS DAU: Yes, sir.

21 Q Now, about three-quarters  
22 of the way over expressed vertically are the figures  
23 ninety-two working days. Am I correct that that is  
24 the number of days you are budgeting to complete this  
25 spread that's around Komakuk Beach at the moment?

26 A Yes, sir.

27 Q Now, is that ninety-two  
28 days for the start of ditching to the completion of  
29 that spread?

30 A I'm sorry. Let me back



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 off sir. The ninety-two days is the estimate we have  
2 for the number of working days that the spread actually  
3 works. The costs in that particular spread are based  
4 on 136 calendar days.

5 Q Yes, okay. But is your  
6 estimate it will take ninety-two working days from the  
7 time ditching starts until the spread is completed?

8 A No, sir.

9 Q What's the estimate for?

10 A The estimate is that  
11 each crew will be paid for 136 days and that in that  
12 136 days, they will work ninety-two days.

13 Q All right. Well, let  
14 me go at this another way.

15 THE COMMISSIONER: 136 is from  
16 the bottom of the line to the top of the line along  
17 the bottom?

18 A No, sir. 136 has no  
19 reference on this drawing at all. I'm going back to  
20 my cost estimates, sir.

21 Q Yes. Sorry. Just so I  
22 don't lose the thread of it. That was Williams' figure  
23 a year ago, 136 days from December 1st to April 15th.  
24 That's where he produced that figure from. He said  
25 we can start hauling on the snow road December 1st and  
26 we've got to shut down by April 15th. So, we actually  
27 get 136 days of pipeline construction.

28 A Yes, it was three and a  
29 half months, sir. Four and a half.

30 Q I want to be able to follow





Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 this when Mr. Hollingworth goes into it. You have from  
2 it looks like 550 freezing degree days till the first  
3 of June. Well, that's about 236 days.

4 A The total calendar days  
5 between 550 freezing degree days and 10 thawing degree  
6 days on that particular year at Komakuk Beach is the  
7 sum of 173 calendar days and 65 which is 218--238  
8 days, sir. Right.

9 Q Now, are you suggesting  
10 that your season is of that length; was of that length  
11 during that year?

12 A Yes, sir. In that  
13 particular year, between 550 freezing degree days and  
14 10 thawing degree days in the winter of '74, '75 at  
15 Komakuk Beach, that season was 238 days.

16 Q Okay. Well, let me just  
17 make sure I'm with you because Mr. Williams first of  
18 all told us it was a 136 day season. Then he brought  
19 it forward by a month from December 1st to November 1st,  
20 that is when the snow road would be ready for hauling,  
21 he brought that back to November 1st approximately,  
22 which gave him 166 day season.

23 Now, you're saying that in  
24 '74, '75 you actually had a 238 day season from--that  
25 represents the time when the snow road is ready for  
26 hauling to the time when it starts to melt to the  
27 point where you can't use the thing. So, you're maybe  
28 right about this but have you got a season now that's  
29 238 days that Mr. Williams thought a year ago was 136  
30 days?



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 A No, sir.

2 Q Okay. Well, explain it  
3 to me.

4 A I mentioned that earlier.  
5 This is an illustration--

6 Q Then say it one last  
7 time.

8 A This is an illustration  
9 in taking the weather records from Komakuk Beach in  
10 the winter of 1974, '75.

11 Q Right.

12 A Making an assumption  
13 that we are correct in that we can start heavy use of  
14 the snow roads or snow pads when we have achieved  
15 550 freezing degree days.

16 Q Yes, I follow that.

17 A We have to stop with  
18 10 thawing degree days.

19 Q Right. I understood that  
20 this afternoon.

21 A Okay, sir.

22 Q Now, what have I missed?

23 A The cost estimates that  
24 we have are based on paying each crew 136 days. That's  
25 a cost estimate, sir, and in that 136 days, for cost  
26 purposes only, we've assumed that we would work 92  
27 days and that there would, therefore, be 44 days that  
28 were non-productive. We've assumed that we would have  
29 to pay the crews for the 10 day Christmas break, which  
30 I don't think you'd have to do, but that's the assumption



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 we made for cost purposes. So, we have for each crew  
2 then 136 calendar days. Now, we recognize that each  
3 crew is not going to start on the same day. They're  
4 going to be staggered and I mentioned earlier today  
5 that this illustration we've assumed a 15 day stagger,  
6 as you can see that then results in the 154 calendar  
7 days from the start of the 550 days going to 173  
8 calendar days which theoretically the last crew finishes.

9 I then went further, sir, and  
10 I said that that's a case that is for that particular  
11 year and we attempted to select that as a very cold  
12 winter. We do have a range of when we achieve 550  
13 freezing degree days and we have a range when we achieve  
14 10 thawing degree days. At Komakuk, that resulted in  
15 a reduction. If we took the latest date on which we  
16 have historical records of 550 freezing degree days  
17 and the earliest date on which we had 10 thawing degree  
18 days, we have to deduct 18 days.

19 Q Yes.

20 A And the 172 work days  
21 that were theoretically available in that year are  
22 then reduced to 154.  
23  
24  
25  
26  
27  
28  
29  
30



Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 Q Yes, well I follow all  
2 of that but, --

3 MR.MARSHALL: Sir, I think it  
4 might help to look at the other two. Komakuk is in a  
5 sense a worse case in that the weather is most severe,  
6 but the other side of that coin, is that <sup>it</sup> gives you the  
7 longest period of time between the 550 freezing degrees  
8 days and the 10 thawing days. If you look to Inuvik  
9 though for example, you're down instead of 238, if my  
10 addition at this hour is right, is 197 days. So there  
11 a significant range between these three examples that  
12 Mr. Dau has worked out in this exhibit.

13 A Perhaps not responding  
14 sir. If your question was in that particular year, was  
15 there 238 days, the answer is yes, there was.

16 Q Yes, in that particular  
17 year?

18 A And there was in that  
19 particular year.

20 Q Taking the range into  
21 account over a period of years --

22 A Then I would reduce that  
23 by 18.

24 Q By 18. Yes.

25 A Now that 18 includes,  
26 that's all the days, from the Christmas break, and the  
27 weather days and everything else.

28 THE COMMISSIONER: Sorry, carry  
29 on.

30 MR. HOLLINGWORTH: Well, well





1       okay, back to Komakuk for a minute, because that's the  
2       one I worked on. You've got a 173 calendar days meeting  
3       65 calendar days at a point, and what does that point  
4       represent Mr. Dau?

5                               A       I'm sorry, I missed your  
6       question.

7                               Q       Well from the left, you  
8       have an arrow and on top of it, it says 173 calendar  
9       days.

10                              A       Yes sir.

11                             Q       And it stops at a line  
12       and after that there's an arrow showing with 65 calendar  
13       days?

14                             A       Yes.

15                             Q       Now what does that line  
16       where they meet indicate?

17                             A       The 65 days?

18                             Q       No, the line between the  
19       two arrows?

20                             A       That corresponds to the  
21       if you go vertically up sir, it corresponds to 107  
22       working days.

23                             Q       In other words, your  
24       point is, that with your 15 day margin, that its taken  
25       173 calendar days to achieve your -- your spread pro-  
26       duction?

27                             A       No.

28                             Q       And you have a cushion of  
29       65 calendar days, am I reading it properly? Mr. Daniels  
30       is podding his head.



Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 WITNESS DANIELS: it's  
2 going to use up 173 calendar days to achieve 107 working  
3 days of work, and that leaves him with the cushion, --

4 Q Okay.

5 A in that year of the 65  
6 calendar days.

7 Q Sorry. That 173 calendar  
8 days starts on the day that 550 freezing degree days  
9 is reached?

10 WITNESS DAU: Yes, that would  
11 be from October 20th plus or minus --

12 Q Yes. But October 20th  
13 isn't in fact when you planned to start going on to  
14 the -- on to the land and making snow roads is it?  
15 You're going to fix a date that will keep you comfort-  
16 ably safe, so that you can start productions?

17 A Yes, we'll start that as  
18 soon as we can sir and if you go to the top, we have  
19 shown you a range of dates for 330 freezing degree  
20 days, between 1973 and '75 and if you want to have the  
21 dates in Komakuk --

22 Q Well I don't need the  
23 dates thank you Mr. Dau, I just wanted to figure that  
24 out. All right, now, you're building along the north  
25 slope in the third season?

26 A Yes sir.

27 Q And you're -- prior to  
28 that winter season, you're going to go in and stock-  
29 pile some sites such as Shingle Point and Komakuk Beach?

30 A Yes sir.



Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 Q And you're going to have  
2 camps that are being used down the Valley?

3 A Yes sir.

4 Q And the summer before you  
5 start this construction, you're going to bring those  
6 camps up by barge and put them at those staging sites?

7 A The summer before I start  
8 pipeline construction?

9 Q Yes.

10 A Yes.

11 Q Okay. Before that, you're  
12 just going to have compressor station pads that have  
13 been built in the winter, out on the north slope?

14 A Some are built in the  
15 winter, I think some are built in the summer, yes.

16 Q Okay.

17 A Yes.

18 Q Now, between those com-  
19 pressor station sites and the beaches --

20 A Yes?

21 Q -- you're going to build  
22 winter roads?

23 A Yes sir.

24 Q Okay. That's what you're  
25 going to start when you hit that 550 degree -- freezing  
26 degree days?

27 A No sir.

28 Q No?

29 A No sir.

30 Q You're going to start



Johanson, Fowler, Rymes  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 that sooner?

2 A Yes sir.

3 Q Well what's the 550  
4 freezing degree days indicate then?

5 A That indicates as I ex-  
6 plained earlier today, the -- our view is the time that  
7 we can apply any load that we want on the snow roads  
8 or the snow pad because we achieved sufficient frost  
9 penetration to carry that load.

10 Q Okay. Let me cut this  
11 short. When are going to start making those snow  
12 roads, at 330 freezing degree days?

13 A Yes, 300 to 330 freezing  
14 degree days, yes sir.

15 Q Of 300 to 330?

16 A Well take a number, 330's  
17 fine.

18 Q 330, okay. Now how many  
19 days does that normally occur before 550, not too  
20 many by the looks of it?

21 A That was what I tried to  
22 give you a little while ago when you said you didn't  
23 want it sir. I was going to give you that. For '74,  
24 '75 it occurred on the 13th day of October.

25 Q I see and when did 550  
26 occur?

27 A On the 21st of October.

28 Q So you had an extra week  
29 then?

30 A Eight days, yes sir.





Johanson, Fowler, Rymes  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 Q Is it your evidence Mr.  
2 Dau, that in that week you're going to be able to have  
3 built your snow roads into the compressor station site?

4 A No sir. I haven't said  
5 that.

6 Q Okay. So when you  
7 achieve 330 freezing degree days, you're going to start  
8 building that road?

9 A Yes sir.

10 Q And first of all you're  
11 going to build into the compressor station sites, then  
12 you're going to start making a road up and down the  
13 right-of-way?

14 A No. Just pick a site  
15 sir, in some cases that's the case and in others it  
16 isn't. You have to -- you know, you've got to be  
17 quite specific on these.

18 Q Well let's go in from  
19 - the nearest compressor station site to Komakuk  
20 Beach, do you have permanent road going in there?

21 A No sir.

22 Q Okay. So you build a  
23 snow road in? Right?

24 A Yes.

25 Q And then when you get  
26 to the compressor station site, you start building a  
27 snow road up and down the right-of-way?

28 A Yes.

29 Q Then you start erecting  
30 your camp?



Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 A No sir.

2 Q It's built?

3 A No it isn't built.

4 We have testified here and at the N.E.B., it's not  
5 necessary to build the calibre of snow road that's  
6 ultimately going to be used up and down the pipeline  
7 right-of-way for stringing of pipe for instance. You  
8 don't need that calibre of road from the beach to the  
9 campsite. It would be a lesser quality of road. I'm  
10 sorry, I've forgotten the rate we planned in miles per  
11 day or something like that. And we agree, there's a  
12 period of time required to get from the beach to the  
13 compressor station site, yes I completely agree.

14 Q And it's after that road  
15 is built, that you start building your camp at the  
16 compressor station site?

17 A That is correct.

18 Q How long does it take  
19 to build the camp?

20 A That also is in the record  
21 sir and I've forgotten whether it's 30 or 45 days.

22 Q Well Mr. Dau I appreciate  
23 that, but it's 30,000 pages of evidence by now and  
24 you'll forgive me for not having --

25 A I can't remember whether  
26 it's 30 or 45 days sir, to erect a camp.

27 Q Pardon me?

28 A To erect the camp.

29 Q Okay. Now is it after  
30 that that the men come in I assume?



Johanson, Fowler, Rymes,  
Walker, Daniels, Dau  
Cross-Exam by Hollingworth

1 A No sir.

2 Q They're in there already  
3 when the camp is being built?

4 A It depends on the site,  
5 that's why I keep saying, it has to be site specific  
6 and the reason it has to be site specific, is that at  
7 many of these locations, a camp already exists at  
8 the site. The camp has been left from either the  
9 double joining operation, a civil construction or the  
10 logistics crews and you have to be site specific. In  
11 many instances, we have 100 men camps and 200 men  
12 camps available at the location, so you have to get  
13 site specific. Now, the contingency planning that is  
14 available in the worst case and it's not been developed  
15 in detail, is to utilize the surplus civil camps that  
16 are available and we have 21 or 22 such camps varying  
17 from, as I recall, 50 to 200 people. They would be  
18 stockpiles in those locations to allow the -- some of  
19 the crew to be available and that's why I say, you  
20 have to get site specific.

21  
22  
23  
24  
25  
26  
27  
28  
29  
30



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 Q Mr. Dau, can we take that  
2 camp again, the one closest to Komakuk, and I'm sorry  
3 I don't have that here.

4 A I'll find it sir. About  
5 Komakuk Beach, sir?

6 Q Yes.

7 A Fine. The camp at  
8 Komakuk Beach is based on Komakuk Beach from August  
9 to April. We required 2.8 miles of snow road to get  
10 to the right-of-way.

11 Q Okay. You've got a camp  
12 at one of those compressor station sites somewhere along  
13 there and I was looking at it earlier. Somewhere along  
14 the North Slope. Is it near Shingle Point?

15 A The camp at Shingle Point  
16 was utilized for spread F between August of year five  
17 and April of year six and it requires--in this particular  
18 instance I don't have a mileage on the snow road but  
19 I'll try and get it for you.

20 Q Well, is the camp to be  
21 at the beach or at the compressor station?

22 A At the beach, sir.

23 Q At the beach. There are  
24 no camps to be at the compressor station site along  
25 there?

26 A It moves later. Eight  
27 miles, seven miles.

28 Q There are no camps at  
29 compressor station sites along the North Slope in Canada  
30 that have to be erected at the beginning of the winter





Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 season?

2 A You're talking about west  
3 of Shallow Bay?

4 Q Yes, sir.

5 A Let me double check it  
6 sir. It was moved later in the season, sir, but the  
7 initial operation is--

8 Q Your answer is there  
9 aren't any?

10 A That's correct, sir.

11 Q How long is it going to  
12 take you to build that road in from Komakuk Beach to  
13 the right-of-way?

14 A Again it's in the record  
15 and I believe it's a mile a day for a snow road, sir.

16 Q Right then and there you  
17 start work on ditching your right-of-way?

18 A Well, when you get the  
19 snow road completed, you obviously have to move in some  
20 equipment and all this.

21 Q Yes.

22 A Certainly you could start  
23 that location and work in one direction, yes.

24 Q Now, you're still budgeting  
25 a 10 day Christmas break?

26 A Yes, sir. Well, no sir,  
27 that's not correct. We are budgeting 44 non-productive  
28 days. For illustrations I've shown a 10 day Christmas  
29 break.

30 Q Mr. Johanson, does that



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 Christmas break usually start around December 15th to  
2 18th and goes through to the first week in January?

3 WITNESS JOHANSON: Yes.

4 Q And it's your evidence,  
5 Mr. Walker, that that Christmas break starts around  
6 December 15, the 20th and starts sometime after New  
7 Years?

8 WITNESS WALKER: Yes.

9 Q Now, the supplementary  
10 evidence, I guess, that was given to us yesterday by  
11 your counsel, Mr. Steeves; typed pages, quite tightly  
12 typed, do you know what I'm referring to?

13 A Sure I do.

14 MR. MARSHALL: It's Mr.  
15 Dau's evidence.

16 WITNESS DAU: Yes, sir.

17 MR. HOLLINGWORTH: Could you  
18 turn to page three of that please.

19 A Yes, sir.

20 Q In the last paragraph of  
21 that you say,

22 "In November and April of the winter of '74 - '75,  
23 there were 62 days below forty-five degree  
24 Fahrenheit wind chill equivalent at Komakuk;  
25 thirty-one at Shingle Point; twenty-one in  
26 Inuvik; and forty-eight at Tuk, giving a mean  
27 of forty-one down days".

28 Isn't it what the worse case  
29 is that you have to consider rather than the mean?

30 A You would have to consider



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau  
Cross-Exam by Hollingworth

1 the worst case at a location, yes.

2 Q Well, shouldn't you, to  
3 be safe, take the worst possible number of down days,  
4 since you're going to be going right across there in  
5 one winter season?

6 A No, sir, because we have  
7 no intention of going anywhere near Tuktoyaktuk and  
8 Inuvik is a long way from the North Slope.

9 Q Yes, well I'm coming  
10 to that. Why did you include Inuvik, since it is  
11 such a long way from the North Slope? It certainly  
12 helps decrease your number of down days or your mean.

13 A We included Inuvik because  
14 we happened to have records there. That's all.

15 Q Right. You included Tuk  
16 for the same reason?

17 A No, Tuk was included  
18 because there was so much conversation about it at the  
19 National Energy Board.

20 Q I see. Now, then you  
21 say,

22 "With the addition of 10 days for Christmas and  
23 a further 5 days to cover other weather  
24 constraints".

25 Those constraints such as  
26 blizzards?

27 A In my view, that would  
28 be blowing snow or something like that.

29 Q Where did that figure  
30 come from?



Johanson, Fowler, Walker,  
Daniels, Rymes, Dau...  
Cross-Exam by Hollingworth

1 A I didn't develop it myself  
2 so I was advised that our people had looked at some  
3 wind records and they'd come to a conclusion that that  
4 might be an approximate number to consider.

5 Q Who advised you  
6 specifically?

7 A The gentleman's name is  
8 Mr. Flood.

9 Q Mr. Flood?

10 A Yes.

11 Q Excuse me. Mr. Dau, you've  
12 probably been around here before when Mr. Williams has  
13 given evidence about the weather conditions. I know  
14 you have.

15 A Yes, at time.

16 Q And you heard the  
17 Commissioner use the figure that Mr. Williams has used  
18 that at minus thirty-five degrees Fahrenheit as a cut-  
19 off date for when work might cease, a cut-off temperature  
20 I should say.

21 A I was not here when he  
22 used that. I understand that he has said that, yes.

23 Q Now, you're using minus  
24 forty-five today.

25 A Wait a minute. Let's  
26 define them, sir. Minus thirty-five degrees Fahrenheit,  
27 not related to wind chill.

28 Q It's your evidence that  
29 Mr. Williams' figure did not have any bearing on wind  
30 chill at all?





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1 A That's my understanding  
2 but I would like to check the transcript to make sure  
3 of that.

4 Q Right.

5 A I was not here at that  
6 time, as I recall.

7 Q So, you don't think  
8 there's much distinction between your figure and that  
9 of Mr. Williams'?

10 MR. MARSHALL: I think he's  
11 saying there may not be any relationship.

12 MR. HOLLINGWORTH: Well, he can  
13 answer that as well as you, Mr. Marshall.

14 A I'm sorry. I missed part  
15 of it. There's no distinction between what?

16 Q Between Mr. Williams'  
17 figure of minus thirty-five degrees and your figure  
18 of minus forth-five degree wind chill, there's no  
19 correlation between the two at all?

20 A I don't know, sir. I've  
21 not made an attempt to make that correlation. I think  
22 I explained that the minus forty-five that I used for  
23 illustration purposes was based on Burns comfort charts  
24 into comfort zone five and that by an approximate  
25 inspection, comfort zone five varies between minus  
26 thirty-five and minus fifty-five and I arbitrarily  
27 took the middle for illustration purposes only.

28 Q So, your evidence today  
29 is really a refinement of what Mr. Williams has said  
30 previously? You've studied this a little more and this



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1 evidence of yours replaces that of Mr. Williams' given  
2 previously?

3 A Well, it doesn't replace  
4 it, sir. This evidence is presented because we now  
5 have further information. We have further information  
6 on lots more weather data than we had previously. We've  
7 gone through calculations of Siple's formula as applied  
8 by atmospheric Canada or whatever it is and have done  
9 the necessary calculations and picked a particular  
10 year and gone through the detailed calculations to  
11 demonstrate what would happen at three locations under  
12 those conditions.



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1 THE COMMISSIONER: The point Mr.  
2 Hollingworth is making and it seems to me is this;  
3 whether for good or ill we got it fixed in our heads  
4 that Mr. Williams had adopted minus thirty-five degrees  
5 Fahrenheit as the kind of cut-off point and he said,  
6 well we'll lose so many days because we can't work once  
7 the temperature falls below that.

8 Now, quite understandably you  
9 say that you've accumulated further data and that you  
10 want us to consider this along with what Mr. Williams  
11 said. Just so that you don't leave the wrong impression  
12 with us, is it the position of Arctic Gas that we  
13 should seek to establish some cut-off point such as  
14 minus forth-five degrees or are you saying that you,  
15 Arctic Gas, doesn't take that position that it is  
16 essentially a matter of judgment to be determined on  
17 the basis of all the factors; temperature, wind  
18 velocity, the presence of blowing snow, and so on and  
19 so forth?

20 I just have a horrible feeling  
21 that somebody is going to tell me a month from now that  
22 you said minus forty-five and that's it. Now, if you  
23 didn't say that, now is--

24 WITNESS DAU: Now is the time  
25 to say so. Mr. Commissioner, the problem I have is  
26 that I try to read the transcript and I'm pretty sure  
27 that when Mr. Williams was talking about minus thirty-  
28 five, he was not talking about equivalent wind chill.

29 Q You're probably right.  
30 I haven't got it before me.



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A We have attempted with the latest information we have to demonstrate that the construction season is a long season on the Arctic coast. We demonstrated it on the basis of the 550 freezing degrees criteria and on the 10 thawing degrees criteria; acknowledging that there's a down time for Christmas, acknowledging that there's some time you have to take away at the beginning of the year because you should use the worst case and also at the end of the season you should use the worst case.

We've put in very arbitrarily a 15 day stagger when the spread starts and stops; they go down in sequence, and have shown that there's still substantial days available for working. Those days are in the best part of the season that you want to work. You don't have the very cold temperatures at the end of the season. I rely--the forty-five I'm not saying is an Arctic Gas criteria and that has to be. I'm only presenting it as an illustration and I'm relying on the evidence of the people that have worked on the Arctic coast in the positions that are far worse than forty-five and production that was economically viable or whatever you want acceptable.

Q Okay. Well, I think that's an excellent summary of your whole case on the matter. I really do.

MR. HOLLINGWORTH: That's it sir.

THE COMMISSIONER: No, it's





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1 an excellent summary of what people have been trying  
2 to tell me for quite awhile.

3 MR. HOLLINGWORTH: I have  
4 conluded. Thank you, sir. Thank you members of the  
5 panel.

6 MR. GOUDGE: And I have no  
7 questions, sir.

8 MR. MARSHALL: I have no  
9 re-examination. The lights are on for nothing.

10 THE COMMISSIONER: I think  
11 before we adjourn, I should just say, Mr. Steeves  
12 and Mr. Marshall, that I've been considering the  
13 statement that Mr. Steeves made about the frost heave  
14 situation as Arctic Gas perceives it now and I under-  
15 stand and appreciate your advising me of the mal-  
16 function and that's at the Calgary Test Center, isn't  
17 it? I was there once.

18 MR. STEEVES: Yes, it is.

19 THE COMMISSIONER: And I  
20 want to make it clear that nothing will impede the  
21 progress of this Inquiry towards the completion of the  
22 hearing of evidence, argument, and the rendering of  
23 a report to the Minister and his colleagues early in  
24 the new year. But I may indicate on Tuesday when we  
25 reassemble and I don't really want to do so now because  
26 I'd like to think about this over the weekend, but I  
27 may indicate when we reassemble on Tuesday that I  
28 require an explanation from Arctic Gas regarding a  
29 number of matters relating to the frost heave issue  
30 without waiting for you to reassemble your equipment



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1 and start the heave going for another two or three years  
2 or however long it took.

3 I don't intend to wait for  
4 the results. I hope I'm making myself clear and if--

5 MR. MARSHALL: That's quite  
6 understandable. We take the position that we ought  
7 to advise the Inquiry as soon as we could even though  
8 we really weren't in a position to answer a lot of  
9 the questions that undoubtedly would come to mind but  
10 we thought that it was preferable to put it on the  
11 record so that it was clear that the problem had arisen  
12 and no one could imagine we were trying to suppress  
13 anything. It's there and we'll do our best to answer  
14 any questions that you may have come Tuesday or  
15 thereafter, sir.

16 MR. STEEVES: I want to make  
17 sure--you asked me a question about this. I want to  
18 make sure that I put it to you accurately so that we're  
19 not getting off on a false trip because I feel that  
20 you understand the question. Can I ask Mr. Dau--Mr.  
21 Dau, did you hear my explanation in answer to the  
22 Judge? If you want to say I was wrong, please do so.

23 WITNESS DAU: Perhaps it  
24 would be simpler--

25 Q The question that  
26 was put to me was whether or not the theory was wrong.  
27 I said no, it's not wrong. I said it's correct.

28 A That's correct. The  
29 theory is not wrong.

30 Q Did I explain correctly



A Not precisely correctly

Q Can you explain it?

THE COMMISSIONER: Maybe you'd

A Yes, sir. Samples of

As I understand it, in the

The effects of the air going

The error was determined after





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1 the National Research Council and borrowed one of our  
2 test cells to conduct some of their own experiments.  
3 They adapted the test cells and modified it some way  
4 that I don't quite understand and got different  
5 readings than we did. They consulted with Dr. Slusarchuk  
6 that the readings were different. There was some  
7 confusion on whether the adaption of the test cells  
8 affected the readings.

9 We conducted further tests and  
10 we have concluded that the original readings were, in  
11 fact, in error because of the faulty membrane. We,  
12 of course, had Dr. Morganstern at the University of  
13 Edmonton conduct tests, similar tests with different  
14 test cells and we're also ourselves, as rapidly as  
15 we can, taking as many soil samples as we can. We are  
16 doing everything we can to get to an answer as fast  
17 as we can. Unfortunately these tests take ten days or  
18 a week and ten days or something for a test.

19 MR. GOUDGE: Okay. I think  
20 that concludes the evidence of this panel, sir, and  
21 that concludes our week.

22 THE COMMISSIONER: All right.  
23 Miss Hutchinson, you might tomorrow morning when the  
24 transcript is available telex to our office in Ottawa  
25 to Dr. Fyles the explanation given by Mr. Dau. Okay,  
26 well thank you very much, gentlemen. It's certainly  
27 a great pleasure for us to hear from you and you have  
28 been very helpful and we appreciate it. So, thank you  
29 very much.



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